Jump, Christine

From: Jump, Christine
Sent: Tuesday, May 13, 2014 4:57 PM
To: Michael Stephenson
Subject: RE: gilbert and mosely docs
Attachments: G&M CAD.pdf

I have attached the Gilbert and Mosley Corrective Action Decision (CAD). This document was finalized in 1994.

The remedy selected allowed alternate clean-up levels for groundwater within the site boundary, however, the ultimate cleanup goal was MCLs. The Responses to comments at the end of the document are helpful in making this point (especially responses to comments # 1, 4, 6c, 7i, and 7J). Later clarifications required the sources to be cleaned up to no contribution above MCLs, but those decisions and clarifications occurred later as the sources were identified and went through the process.

Let me know if you have any questions. I was the project manager for the Gilbert and Mosley project and wrote this document for the state, so I know it well.

I am leaving the office in a couple of minutes, but I will be back in the office tomorrow.

Chris Jump, L.G.
Waste Remediation and Permitting Branch
US EPA, Region 7
jump.chris@epa.gov
(913) 551-7141

Mailing address: 11201 Renner Boulevard, Lenexa, KS 66219

From: Michael Stephenson [mailto:mstephenson@cameron-cole.com]
Sent: Tuesday, May 13, 2014 4:25 PM
To: Jump, Christine
Subject: gilbert and mosely docs

Hi Chris,

Marty mentioned (and I believe you and I spoke about) that you and he had spoken about using some of the gilbert and mosely documents to establish MCLs as the target for groundwater quality as early as 1992. He has asked me to find some documents to this regard on the KDHE web page and I am coming up empty.

Can you provide me with any guidance as to where to find this type of information? I'd appreciate it.

Thanks,

Mike Stephenson
Principal Scientist
Cameron-Cole, LLC
50 Hegenberger Loop
Oakland CA 94621
office - 510.777.1864
mobile - 510.773.9895

mstephenson@cameron-cole.com

File: Gilb & Mos 2
C2 087 00175

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
FINAL CORRECTIVE ACTION DECISION
GILBERT AND MOSLEY INTERIM GROUND WATER REMEDIATION

DECLARATION OF INTERIM REMEDIAL ALTERNATIVE SELECTION

SITE NAME AND LOCATION:

Gilbert and Mosley Site
Wichita, Kansas

STATEMENT OF BASIS AND PURPOSE

This Final Corrective Action Decision document presents the interim remedial ground water actions selected for the Gilbert and Mosley Site located in Wichita, Kansas. The Gilbert and Mosley Site is a large ground water contamination problem comprising 2,600 acres in downtown Wichita. The selected interim remedial actions were developed in accordance with guidelines from the State Cooperative Program, and the Federal Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The Gilbert and Mosley Site is a State-lead site managed under State authority. The interim remedial selection was based upon documents and information contained in the Administrative Record file for the site. The Administrative Record file is available for public review at Wichita-Sedgwick County Health Department and Kansas Department of Health and Environment District Office in Wichita, Kansas, and Kansas Department of Health and Environment Central Office in Topeka, Kansas.

The United States Environmental Protection Agency has been consulted and concurs on this interim remedial action.

DESCRIPTION OF THE SELECTED REMEDY

The Kansas Department of Health and Environment (KDHE), in consultation with the United States Environmental Protection Agency (EPA), has determined that the selected interim remedial actions, described and evaluated in the Draft Corrective Action Decision, satisfy or meet the criteria established by both the State and Federal programs and will be protective of human health and the environment.

The interim remedial actions selected for the Gilbert and Mosley Site are described below:

- Institutional Controls - Establish institutional controls within the defined boundaries of the Gilbert and Mosley Site. The City staff must propose an ordinance to the City Council to prohibit the connection of newly constructed private water wells for private or public drinking water purposes. If passed by the City Council, the ordinance would be enforced through an inspection program by the City. In addition, a public educational program should be initiated to discourage the use of ground water contaminated above the Maximum Contaminant Levels (MCLs) within the Gilbert and Mosley Site.

- Hydraulic Containment - Establish hydraulic containment to prevent further migration of contaminated ground water through the implementation of ground water extraction, treatment and disposal. Ground water contaminated above KDHE's Alternate Cleanup Levels (ACLs) would be targeted for extraction. Recovered ground water would be treated to MCLs at the surface by air strippers for the contaminants of concern. Off-gas from the air strippers would be initially monitored to determine the necessity of secondary treatment through granular activated carbon. Treated ground water would be disposed of by either reinjection through a configuration of injection galleries and/or by diverting the water to the City's water treatment plant for blending with other raw water sources for reuse in the City's public water distribution system, and/or other approved beneficial uses of the treated water. The reinjection disposal option would also include addition of oxygen, methane, or other growth substrates, microorganisms, and nutrients to enhance biological activity to aerobically degrade some of the contaminants of concern. However, the exact microbiological enhancement would have to be determined through treatability and pilot scale studies as outlined below. Hydraulic containment could be terminated once the ACLs have been achieved and sustained over a one year period.

- Compliance Monitoring - Establish compliance monitoring wells at the zero line (i.e. the area where ground water contamination is below the MCLs) to monitor on a quarterly basis or other frequency as determined by KDHE for the chemicals of concern. If any one of the compliance monitoring wells exceed the MCLs, additional remediation would be required.

- Long Term Monitoring - Long term monitoring would be required at the compliance and selected monitoring wells for a minimum period of ten years of annual monitoring following termination of hydraulic containment.

- Individual Source Control Activities - Individual source control activities must be established at all identified source areas to eliminate and/or reduce the toxicity, mobility and volume of waste/contaminant at the site. Source controls will be determined on an individual basis following an appropriate source investigation.

- Microbiological Studies - A microcosm study, small scale field demonstration and/or a full scale pilot study including specialized microbiological testing will be performed at the site to demonstrate the efficiency and economics of microbiological enhancement. If these studies demonstrate that microbiological enhancement is effective, then treated water would be enhanced prior to reinjection to decrease projected clean-up times. If the pilot studies indicate, however, that microbiological enhancement is not applicable, then treated water would be directed to a beneficial use.

DECLARATION:

The selected interim remedial actions are protective of human health and the environment, attain State, Federal and local requirements that are applicable or relevant and appropriate to this interim remedial action and provides a cost-effective response. This interim remedial action also actively reduces the toxicity, mobility and volume of contamination at the site. This interim remedial action does not constitute final remedy for the Gilbert and Mosley Site. Such final remedial action will be determined following the identification and investigation of source areas. Because this is an interim remedial action review and monitoring of the Gilbert and Mosley Site will continue as KDHE develops final remedial alternatives for the site.

In selecting and declaring this interim remedy, KDHE believes implementation of this interim remedial action will have a beneficial effect on health and the environment outside the Gilbert and Mosley boundaries by managing the migration of ground water contamination to unimpacted areas.

9/30/94

DATE

Robert C. Harder

Dr. Robert C. Harder
Secretary

Attachments: Corrective Action Decision Summary

KDHE's CORRECTIVE ACTION DECISION
FOR
INTERIM GROUND WATER REMEDIATION

FINAL

GILBERT AND MOSLEY SITE

WICHITA, KANSAS

September 28, 1994

TABLE OF CONTENTS

ATTACHMENTS

FIGURES

INTRODUCTION

The Kansas Department of Health and Environment (KDHE) is hereby presenting a Final Corrective Action Decision (CAD) for interim ground water remediation at the Gilbert and Mosley Site located in Wichita, Kansas. The final CAD describes and discusses KDHE's selected alternative for interim ground water remedial action. Additional investigation of source areas and source control, if necessary, will be implemented as part of the CAD. This interim ground water remedial action will be consistent with the final remedial action for the Site.

1.0 PURPOSE OF FINAL CORRECTIVE ACTION DECISION

The primary purposes of the final CAD are to: 1) highlight key information from the Remedial Investigation (RI) and Feasibility Study (FS) reports; 2) briefly describe the alternatives for site remediation detailed in the RI and FS reports, and draft CAD; 3) document significiant changes from the draft CAD and 4) provide a response to comments summary of comments received during the public meeting held on June 21, 1994 and the public comment period (June 6, 1994 to July 6, 1994).

RI and FS reports were prepared for the Gilbert and Mosley Site (the Site) by Camp Dresser and McKee, the consultant for The City of Wichita (The City). Work performed during the RI and FS process followed the terms outlined in a Consent Agreement between The City and KDHE. The public is encouraged to review and comment on the technical information presented in the RI and FS reports and other documents contained in the Administrative Record file (AR file). The AR file includes all pertinent documents and site information which form the basis and rationale for selection of the remedial alternative. Both the RI and FS reports, the draft CAD and the AR file are available for public review and copying at the following locations:

Kansas Department of Health and Environment
Bureau of Environmental Remediation
Forbes Field, Building 740
Topeka, Kansas
CONTACT: Rick Bean, Chief,
Remedial Section
(913) 296-1665

Kansas Department of Health and Environment
Wichita District Office
1919 Amidon, Suite 130
Wichita, Kansas
CONTACT: Kyle Parker, District Geologist
(316) 838-1071

Wichita-Sedgwick County Health Department
1900 East Ninth Street
Wichita, Kansas 67214-3198
CONTACT: Jack Brown, Director
(316) 268-8351

2.0 SITE BACKGROUND

2.1 Site Location

The Gilbert-Mosley Site is located in Wichita, Kansas in Sedgwick County. The approximate boundaries of the Gilbert and Mosley Site are illustrated in Figure 1. The Site is generally bounded by 2nd Street to the north and 31st Street to the south. The western border is approximately defined by Wichita Street to Skinner Street and then angles southeast to the intersection of 31st Street and Washington Street. The eastern border is approximately defined by Indiana and Pattie Streets to Lincoln Street, then angles southeast to a point near the intersection of Tulsa and Madison Streets.

The Site is approximately 2,600 acres in size, covers an area approximately 3.8 miles long from north to south, and varies in width from 0.86 to 1.27 miles from west to east. The Site boundaries were defined by a series of investigations and finalized in a settlement agreement between KDHE and the City.

2.2 Physical Setting

The land use within the Gilbert-Mosley Site is diversified. Uses include residential, commercial, recreational, and industrial. The northwest portion of the Site primarily consists of a portion of the downtown Wichita business district. The industrial facilities within the Gilbert-Mosley area are primarily located in the far north and northeast, the southeast, along Washington Street and Southeast Boulevard, and along the Oklahoma, Kansas, and Texas railroad line, which runs north-south between Mosley and Santa Fe Streets.

Commercial property includes part of the downtown district as well as property situated along the major north-south streets of Broadway, Washington, and Hydraulic; and along the major east-west streets of First, Kellogg, Lincoln, Harry, and Pawnee. The majority of the Site is residential, consisting of single-family residences. These residences are primarily situated south of Kellogg Avenue. The 1980 census information indicated that 10,938 of the 13,458 houses in the Gilbert-Mosley area are single housing units.

2.3 Site History

The present boundaries of the Gilbert-Mosley Site were developed as a result of a series of site investigations that have been conducted privately and by the KDHE since 1986. As part of a Resource Conservation and Recovery Act (RCRA) hazardous waste compliance inspection in 1986 at B & G Plating located at 1023 East Harry, the KDHE sampled the facility's industrial well. High levels of VOCs were detected in the well. The KDHE entered into a Cooperative Agreement with the US EPA Region VII by which KDHE has performed an initial investigation of potential contamination within the vicinity of the Site, in accordance with the Comprehensive Environmental Response Compensation Liability Act of 1980 (CERCLA) and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Under the Cooperative Agreement, KDHE conducted a Preliminary Assessment (PA) and Screening Site Investigation (SSI) of the Site. The investigations were documented in a report submitted by KDHE to

US EPA in November, 1989, which recommended that a Listing Site Investigation (LSI) be conducted at the Gilbert-Mosley Site to document information necessary for evaluation for inclusion on the National Priority List (NPL or Superfund List).

In August 1990, the KDHE presented a report, which supplemented the November 1989 report, to the US EPA of the findings of the LSI. Additional work performed during the LSI included a soil gas investigation, drilling and sampling of monitoring wells and test holes, and sampling of existing private wells. Information obtained from monitoring wells installed by the Coleman Company, Inc. (Coleman) and other local businesses was also incorporated into the LSI report.

Contamination was detected in wells as far north as Second Street and as far south as Tulsa Street which indicated the need for a more detailed study to identify the sources and the extent of the contamination.

The City of Wichita decided to take the lead on the site investigation because of potential threat to public health and environment and because property values and a downtown revitalization program could be affected. The City of Wichita commenced several actions, which are summarized below:

- On March 26, 1991, the City of Wichita and the KDHE finalized a "Settlement Agreement for Remedial Investigation and Feasibility Study, and for Certain Remedial Actions to be Determined Following Opportunity for Public Involvement". The Agreement outlines the requirements of the Remedial Investigation/Feasibility Study (RI/FS), performance of public involvement activities and the remedial activities to be determined at the site.

- On April 23, 1991, the City of Wichita and Coleman finalized an agreement. This agreement outlined the manner in which Coleman would pay for a portion of the RI/FS and remedial actions at the Site. The agreement also provided for the sharing of information and approval of activities by both parties.

- In July 1991, the formation of a tax increment financing district (TIF) and redevelopment district for the Site area occurred. The tax district is a secondary mechanism used to generate funds for studies and remedial actions at the Site. The City took this action based on its recognition that the existence of contaminated ground water in the area might pose a threat to the health and environment of the citizens of the City of Wichita and might pose an economic threat to the City and operators of property located within the Site.

- On August 2, 1991, the City commenced a program that allowed an owner or potential owner of property within the Gilbert-Mosley Site to apply for "Certification and Release for Environmental Conditions". If granted, the certificate would release owners or potential owners from liability for costs incurred for environmental investigation and remediation of the Gilbert-Mosley Site.

- In February 1991, the City selected Camp, Dresser and McKee (CDM) to conduct the RI/FS investigation.

3.0 SUMMARY OF THE REMEDIAL INVESTIGATION

3.1 Activities of the Remedial Investigation

The objectives of the RI include: 1) determination of the nature and extent of contamination at the Site, 2) characterization of the local hydrogeology, 3) estimation of the rate of contaminant migration, 4) identification of Applicable or Relevant and Appropriate Requirements (ARARs), and 5) assessment of the exposure and toxicity potential to human health and the environment.

The RI activities consisted of a two phase investigation. The first phase of the investigation consisted of a review of all available data from KDHE, the City, and Coleman. The purpose of this exercise was to identify information gaps and select monitoring well locations that would help determine the nature and extent of ground water contamination as well as other source areas of contamination. Phase 1 of the RI activities resulted in the generation of a data review report and work plans for the second phase of investigations.

The second phase of the RI activities included a field investigation, baseline risk assessment, and the generation of the RI and FS reports. The field activities consisted of the following:

- Lithologic (subsurface soils) sampling to bedrock at 23 locations throughout the site
- Installation and development of 47 monitoring wells at 23 locations, with at least one deep and one shallow well at each location
- Collection of 67 subsurface soil samples for organics and metals analyses
- Sampling and analyses of 45 of the newly installed monitoring wells during Round 1 sampling in January, 1992
- Sampling and analyses of 103 wells (47 new and 56 existing) during Round 2 sampling in June, 1992
- Collection and analyses of 19 indoor air quality samples
- Collection and analyses of 11 Round 1 and 2 Round 2 surface water samples
- Collection and analyses of 3 Round 1 and 1 Round 2 storm sewer samples
- Collection and analyses of 9 sediment samples during Round 1 sampling
- Monitoring of ground water drawdown and recovery during monitoring well development to determine preliminary aquifer characteristics
- Short term pumping tests to define aquifer characteristics at 5 locations

3.2 Results of the Remedial Investigation

Subsurface samples collected during drilling resulted in the identification of six lithologic units at the Site. The lithologies, increasing in depth below the ground surface, are summarized below.

- Unit 1 - Asphalt, concrete, and/or fill, which may consist of sand, clay, gravel, silt or a combination of these lithologies; variably present throughout the Site. The thickness varies from 0 to 7 feet.

- Unit 2 - A silty sand, sandy silt, or silty clay; brown, tan, or orange; continuous across the Site. The thickness varies from 2 to 11 feet.

- Unit 3 - A fine to coarse sand; tan to orange; moderately sorted; continuous across the site. The thickness varies from 3 to 17 feet.

- Unit 4 - A fine to very coarse sand with local gravel lenses; tan to tan-gray; generally poorly sorted, but may be well sorted locally; continuous across the site. The thickness varies from 8 to greater than 24 feet.

- Unit 5 - A silty clay; plastic (fat) and may be locally organic rich; only present at some locations. The thickness varies from 0 to 3 feet.

- Unit 6 - A silty weathered shale; olive-gray to blue-gray; the upper surface may be weathered to a dense clay consistency; bedrock is the Wellington Shale and is present across the site.

Unit 4 is the principal water yielding unit. Short term pumping tests conducted at five locations indicated a hydraulic conductivity ranging between 380 ft/day and 809 ft/day. The storativity ranged between 0.0265 and 0.0795. The ground water flows principally to the south with a hydraulic gradient between 0.007 ft/ft and 0.0014 ft/ft. This gradient is similar to the topographic land surface gradient of 0.0010 ft/ft for the Site from north to south. The average ground water velocity for the Site as determined by a calibrated ground water flow model ranged from 1.2 to 1.7 feet per day.

Ground water flows to the Arkansas River and possibly Chisholm Creek which lie southwest, south, and southeast of the site. Discharge of ground water to the Arkansas River appears to occur from an interval below the Harry Street bridge (southwest of the Site) downstream to the confluence of Chisholm Creek and the Arkansas River (southeast of the Site). Discharge of ground water from the Site into Chisholm Creek appears to be occurring between Kellogg and the confluence with the Arkansas River.

The principal chemicals of concern are tetrachloroethene (PCE), trichloroethene (TCE), total (both cis and trans) 1,2-dichloroethene (1,2-DCE), vinyl chloride (VC), 1,1-dichloroethene (DCE), chloroform, and benzene. Areas with benzene detected in the ground water have been referred to the KDHE Underground Storage Tank (UST) section. The other contaminants of concern are related to chlorinated solvents. PCE, TCE, 1,2-DCE, and vinyl chloride have the largest area of distribution in ground water at the Site. Figures 2, 3, 4, and 5 show the extent of these contaminants at the Site. The total area of contamination above the Maximum Contaminant Levels (MCLs) is 1,805 acres containing over 2.75

billion gallons of ground water. The RI investigation indicates that the KDHE boundaries are sufficient to define the extent of contaminated ground water above MCLs except in three areas. PCE and TCE contaminated ground water appears to be present above MCLs just outside the northeast portion of the Site. TCE contaminated ground water appears to be outside the Site boundaries at two locations. The first location is near the center of the eastern border at Harry Street. The second location is at the southeast boundary of the Site.

No significant subsurface soil contamination was observed at locations sampled during the RI. Soil contamination, however, is expected to be present at source area locations. No significant surface water, storm water, or sediment contamination was encountered with respect to chlorinated solvents during the RI. Chlorinated solvents were detected in indoor air quality samples that were collected in areas over ground water with high concentrations of chlorinated solvents.

A total of 19 separate potential source areas were identified as a result of the RI. These areas have been divided into three categories based upon the available data.

- Areas in which both PCE and TCE sources appear to be present (7 areas)
- Areas in which only PCE sources appear to be present (7 areas)
- Areas in which only TCE sources appear to be present (5 areas)

These areas were identified either through the sampling program, evaluation of data, and/or by visual or historical observations. The areas consist of one or more blocks in size and may have more than one Potential Responsible Party (PRP) located within the area. There are two classifications for source areas, probable and possible. "Probable" areas have relatively high contaminant concentrations and better data which is due generally to a larger number of ground water sampling points in the area. "Possible" areas generally lack sufficient ground water sampling points and have moderate to low contaminant concentrations which are only slightly greater than upgradient concentrations. The suspected source areas are shown on Figures 6, 7, and 8.

4.0 SUMMARY OF SITE RISKS

The objective of the Gilbert and Mosley Site baseline risk assessment (BRA) was to evaluate potential human health and ecological risks that might result from exposure to chemicals present at the Gilbert-Mosley Site if no remediation was performed. Baseline risks (i.e., those posed by the Site in the absence of any remediation) are subsequently used as one of several criteria to evaluate proposed remedial alternatives and set remedial action goals.

4.1 Human Health Risk Assessment

The scope of the human health risk assessment included evaluation of noncarcinogenic and carcinogenic health risks that might be associated with long-term exposure (up to 30 years for an adult). The health risk estimates were based on concentrations of chemicals in ground water at the Gilbert-Mosley Site. The focus of this assessment was ground water since ground water has measurable amounts of numerous contaminants, primarily volatile organic compounds (VOCs). There is no indication of significant

concentrations of chemicals in site soils, however, screening level analysis was conducted for soil media using soil data reported by Coleman at their downtown facility based on the assumption that similar soil contamination levels might be encountered elsewhere on the site. Exposure via surface water and sediments was considered unlikely since nearby surface waters and sediments are not significantly contaminated.

Human exposure pathways considered to result in the highest exposure were selected for quantitative evaluation during the BRA. Human exposure pathways via two media (ground water and soil) were evaluated. For ground water these pathways are: 1) inhalation of indoor air contaminated by VOCs migrating from contaminated ground water into living/working spaces; 2) ingestion of contaminated ground water; and 3) inhalation of VOCs released from contaminated ground water while showering. These pathways, which consider future risk, are hypothetical and conservative because no ground water at the Site is currently used for drinking water or shower supplies, and the ambient air concentrations used in the risk assessment were collected in crawl spaces and basements with little air circulation.

For soil, the pathways evaluated are: 1) inhalation of VOCs released from contaminated soil while conducting excavation activities; and 2) incidental ingestion of contaminated soil while conducting excavation activities. These pathways, which consider future risk, are hypothetical because no contaminated soil has yet been documented outside the Coleman downtown facility. Additionally, these calculations are conservative since the exposure times and exposure frequency assumed that the excavation worker was repeatedly exposed to the contaminated soil for up to six months.

As recommended by the US EPA guidance, potential human exposures were evaluated based upon a reasonable maximum exposure (RME) approach. The goal of the RME approach was to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures.

4.1.1 Ground Water

Current exposures to residents are expected to be small to nonexistent, because current ground water exposure pathways are incomplete. No significant ongoing exposures exist for current Wichita residents within the Gilbert and Mosley site boundaries. There is a potential for downgradient targets to be impacted in the future, assuming continued migration of contamination.

Assuming the hypothetical pathways for future risk, those receptors that were considered likely to receive the greatest exposure at the site are current and future on-site workers and future adult and child residents. Inhalation of ambient indoor air was assessed for current on-site workers since air monitoring indicated that individuals in the industrialized area of the Gilbert-Mosley site have the highest potential for exposure via this pathway. Exposures via ground water ingestion and use were assessed only for future populations (on-site worker and resident adult and child) since on-site ground water is not currently used for these purposes. Potential use of ground water in the future, both on-site and off-site, however, is not ruled out. Potential human health risks from estimated exposures were evaluated for each chemical and for chemical mixtures based on toxicity criteria developed by the EPA.

Chemicals for human health evaluation were selected based primarily on toxicity and frequency of detection. The following chemicals were selected for human health evaluation: benzene; chloroform; 1,1-DCE; 1,2-DCE; PCE; TCE; and VC.

The results of the exposure analysis for future receptors indicate that the potential exposures from ingestion of ground water and inhalation of VOCs released during showering were very similar. However, as stated previously, these two situations are hypothetical and are not expected to occur on site under current conditions. Chronic Daily Intakes (CDIs) via inhalation were approximately 1.5 times that for intake via ingestion. CDIs were highest in the northern most section of the Gilbert-Mosley site where ground water contaminant levels are the highest. Among individual chemicals, TCE is present in the highest concentration and consequently has the highest CDI.

Cancer risk estimates for the combined hypothetical ingestion and inhalation routes were highest in the northernmost section of the Gilbert-Mosley site where estimated risks are 4 to 8 additional cancer incidents in 1,000 exposed individuals over a lifetime (10^{-3}) incremental risks. Estimated cancer risks were 1 to 2 orders of magnitude less in other parts of the Site. Cancer risk estimates for all receptors, including those for inhalation of indoor air by an on-site worker, exceeded 1 x 10^{-5} additional cancer incidents. Risks generally characterized as acceptable by EPA range from one additional cancer incident per lifetime exposure per one million residents to per ten thousand residents (10^{-6} to 10^{-4} additional incidents). Therefore, cancer risks at the Gilbert and Mosley site exceed the EPA risk range of 1 x 10^{-4} to 1 x 10^{-6}. Noncarcinogenic effects are possible in the most contaminated portion of the Site north of Kellogg. However, noncarcinogenic adverse effects are not expected for receptors in other areas since calculated intakes do not exceed daily exposures (references doses) generally considered safe. Current evaluations indicate that the indoor air quality has been impacted in areas north of Kellogg. The result, however, is based upon limited and somewhat conflicting data. Therefore, more samples are necessary to quantify the potential risks.

4.1.2 Soils

The receptors in the risk analysis for soils were assumed to be construction workers who might be exposed to contaminated soil and soil vapors during excavation and trenching activities. The additive cancer risk estimates for incidental ingestion of soil by the worker is 1.3 x 10^{-8} and for inhalation of soil vapors by the worker is 1.4 x 10^{-5}.

These risks fall within the EPA acceptable risk range of 1 x 10^{-4} to 1 x 10^{-6}. Since these risks are estimated "worst case" or upperbound, actual risks are likely to be much lower, even for reasonable maximum exposures. Finally, the EPA risk range is most applicable for non-occupational exposures as somewhat higher risks are often acceptable in occupational settings. Therefore, the "worst case" risks for workers exposure to contaminants in subsurface soil fall within an acceptable range.

4.2 Ecological Risk Assessment

The objective of this ecological risk assessment was to evaluate the potential effects of contaminated media from the Gilbert-Mosley Site to species that reside in or use site or near-site areas. Media considered include ground water, surface water, and sediments. Data on chemical concentrations found in these media were compared to criteria for aquatic life and other appropriate toxicity values. These comparisons were used to determine chemical concentrations in various media that would be protective of ecological receptors.

Results of the ecological risk assessment indicate minimal to no risk is associated with contamination originating from the Gilbert and Mosley Site. However, polycyclic aromatic hydrocarbons (PAHs) in the sediments pose both a direct risk to some bottom-dwelling organisms and an indirect risk to other aquatic organisms. It does not appear that PAHs have been released in significant amounts by sources at the Gilbert and Mosley Site. PAHs can originate from many sources, including urban storm water drainage runoff, atmospheric deposition, incineration, etc.

5.0 SCOPE AND ROLE OF RESPONSE ACTION

As discussed in Section 4.0 the BRA indicates that the greatest risk to human health could occur from: 1) future ingestion of ground water contaminated by VOCs; 2) future inhalation of VOCs from showering with contaminated ground water; and 3) inhalation of ambient indoor air contaminated by VOCs migrating from ground water or soils into living and working areas. The primary route of exposure for future use is through domestic use of water from existing or new water wells. The point of ingestion may be either at, or downgradient of, the Gilbert and Mosley Site. Contaminants of concern and the corresponding MCLs and KALs, and the maximum concentrations found are presented in Attachment I.

An integral component in determining the interim remedial response objectives is the evaluation of Applicable or Relevant and Appropriate Requirements (ARARs). ARARs are federal, state and city standards of control and/or other requirements that specifically address or are designed to apply to a hazardous substance, pollutant, action or other circumstance found at a contaminated site. Please refer to the RI Report, Section 6 for further discussion of ARARs.

5.1 Interim Remedial Response Objectives

Based upon the findings of the RI/FS, the following interim remedial response objectives have been established for the Gilbert and Mosley Site.

1. Prevent future on-site ingestion of contaminated ground water that would exceed EPA's recommended 10^{-4} to 10^{-6} risk level.

2. Prevent off-site migration of contaminated ground water that would exceed EPA's recommended 10^{-4} to 10^{-6} risk level.

3. Prevent future risks of inhalation of VOCs through showering that would exceed EPA's recommended 10^{-4} to 10^{-6} risk level.

5.2 Alternate Clean-up Levels

The Preliminary Remediation Goals (PRGs) as defined in the FS report were modified based upon consideration of appropriate factors including: exposure factors, uncertainty factors and concerns regarding cumulative effects of multiple contaminants. Alternate Clean-up Levels (ACLs) were established by KDHE following US EPA recommended guidance documents (EPA/540/1-89/002 and EPA/540/R-92/003) and were based upon data collected during the RI and BRA. Cumulative risk to human health was evaluated due to the existence of multiple contaminants, exposure pathways and source areas at the site. The ACLs are designed to meet the mandated minimum requirements (10^{-4} to 10^{-6} risk) as defined by CERCLA. The ACLs include chemical specific 10^{-5} excess carcinogenic risk concentrations, or federal MCLs, whichever are greater to address the uncertainties associated with cumulative risk factors. KDHE's ACLs, the 10^{-5} chemical specific risk levels, and the MCLs are presented as Attachment II.

The conclusions of the BRA, the identification of interim remedial response objectives, and the determination of ACLs provided the basis for selection of the interim remedial alternative. The selected alternative will reduce the cumulative risk for VOCs to acceptable risk levels (10^{-4} to 10^{-6}) through the extraction, treatment and disposal of contaminated ground water.

6.0 SUMMARY OF ALTERNATIVES

6.1 Screening and Formulation of Alternatives

The Feasibility Study evaluates three general response actions which could be applied to the contaminated media and conditions known to exist at the Gilbert and Mosley Site. The general response categories include: (1) no action, (2) containment, and (3) treatment. The feasibility study identified and screened remedial action technologies associated with each general response action previously identified. The screening criteria used for the analysis included effectiveness, implementability and cost of the remedial action technology. Those remedial action technologies failing to meet the pre-defined criteria were screened out of the process.

The interim ground water remedial alternatives selected for further evaluation are presented below. These alternatives, which were formulated by combining the technologies and process options that passed initial screening, are numbered to correspond with the FS report.

* Alternative 1: No Action.

* Alternative 2: Limited Action.

* Alternative 4A: 10^{-4} Extraction, Treatment and Reinjection

* Alternative 4B: 10^{-4} Extraction, Treatment, Reinjection with *In situ* Bioremediation

* Alternative 5B: Extraction to MCLs, Treatment and Off-site Disposal.

* Alternative 5C: Northern Extraction, Treatment, Off-site Disposal.

* Alternative 5D: 10^{-4} Extraction, Treatment and Off-site Disposal.

* Alternative 5E: Hot Spot Extraction, Treatment and Off-site Disposal.

* Alternative 5F: Hot Spot Extraction, Treatment, Air Sparging, and Off-site Disposal.

6.2 Detailed Evaluation of Interim Remedial Action Alternatives

Under the "No Action" alternative, no further remedial action would occur. Ground water monitoring wells would be installed and sampled to monitor contaminant migration. Additionally, the "Limited Action" alternative would include ground water monitoring, ground water use restrictions, and a public education program. All other remedial action alternatives considered for the Gilbert and Mosley Site include a number of common components. The series of remedial action alternatives designated as 4 (A,B) and 5 (A,C,D,E,F) include ground water extraction and treatment by air stripping. Alternatives 4A and 4B include reinjection of treated ground water through injection galleries. Alternative 4B also includes *in situ* bioremediation. Alternatives 5A through 5F include three different discharge options: discharge to surface water, discharge to the Public Owned Treatment Works (sanitary sewer), and re-use of the water in the public water supply system. Alternative 5F also includes aquifer sparging to expedite clean up.

In addition, alternatives evaluated during the FS addressed the magnitude of clean-up: 1) complete clean up to MCLs (alternative 5B), 2) containment and clean up to CERCLA protective levels of 10^{-4} to 10^{-6} (alternatives 4A, 4B, 5C, 5D), and 3) clean-up of hot spots (alternatives 5E, 5F).

The interim ground water remedial action alternatives were evaluated following nine specific criteria defined by the National Contingency Plan (NCP). These criteria include: 1) short-term effectiveness; 2) long-term effectiveness, 3) compliance with ARARs, 4) reduction in toxicity, mobility, and volume, 5) implementability, 6) overall protection of human health and the environment, 7) cost, 8) regulatory acceptance, and 9) community acceptance. Please refer to the FS Report for a detailed evaluation of the interim ground water remedial action alternatives following these criteria.

Attachment III provides a comparison and an evaluation of the nine criteria of each alternative. Capital costs, operation costs and maintenance costs were evaluated for each remedial action alternative. A discount factor of five percent (5%) was used to calculate present worth costs.

The selected alternative for the Gilbert and Mosley Site is hydraulic containment of ground water contamination above ACLs (10^{-4} cumulative risk levels) , treatment to MCLs , establishment of ground

water compliance points, institutional controls and a contingency for source control. This can be accomplished through the combination of alternatives 2, 4B and 5D.

7.0 SUMMARY OF THE SELECTED ALTERNATIVE

The selection process for the interim ground water remedial alternative for the Gilbert and Mosley Site was based upon the following requirements: 1) additional remedial action would be implemented at identified source areas, 2) the interim ground water remedial action would be CERCLA protective (10^{-4} to 10^{-6}) of human health and the environment, and 3) the interim ground water remedial action would satisfy the remedial action objectives.

KDHE's selected interim ground water remedial alternative is described as follows:

Establish institutional controls within the newly defined boundaries (see page 14) of the Gilbert and Mosley Site. The City staff must propose an ordinance to the City Council to prohibit the connection of newly constructed private water wells for private or public drinking water purposes. If passed by the City Council, the ordinance would be enforced through an inspection program by the City. In addition, a public educational program should be initiated to discourage the use of ground water contaminated above the MCLs within the Gilbert and Mosley Site.

Establish hydraulic containment to prevent further migration of contaminated ground water through the implementation of ground water extraction, treatment and disposal. Ground water contaminated above KDHE's ACLs would be targeted for extraction. Recovered ground water would be treated at the surface by air strippers to MCLs for the contaminants of concern. Off-gas from the air strippers would be initially monitored to determine the necessity of secondary treatment through granular activated carbon. Treated ground water would be disposed of by either reinjection through a configuration of injection galleries and/or by diverting the water to the City's water treatment plant for blending with other raw water sources for reuse in the City's public water distribution system, and/or other approved beneficial uses of the treated water. The reinjection disposal option would also include addition of oxygen, methane, or other growth substrates, microorganisms, and nutrients to enhance biological activity to aerobically degrade some of the contaminants of concern. However, the exact microbiological enhancement would have to be determined through treatability and pilot scale studies as outlined below. Hydraulic containment could be terminated once the ACLs have been achieved and sustained over a one year period.

Establish compliance monitoring wells at the zero line (i.e. the area where ground water contamination is below the MCLs) to monitor on a quarterly basis or other frequency as determined by KDHE for the chemicals of concern. If any one of the compliance monitoring wells exceed the federal MCLs, additional remediation would be required.

Long term monitoring would be required at the compliance and selected monitoring wells for a minimum period of ten years of annual monitoring following termination of hydraulic containment.

Individual source control activities must be established at all identified source areas to eliminate and/or reduce the toxicity, mobility and volume of waste/contaminant at the site. Source controls will be determined on an individual basis following an appropriate source investigation.

A microcosm study, small scale field demonstration and/or a full scale pilot study including specialized microbiological testing will be performed at the site to demonstrate the efficiency and economics of microbiological enhancement. If these studies demonstrate that microbiological enhancement is effective, then treated water would be enhanced prior to reinjection to decrease projected clean-up times. If the pilot studies indicate, however, that microbiological enhancement is not applicable, then treated water would be directed to a beneficial use.

The exact design of the selected interim ground water remedial system will be detailed during the Remedial Design phase. It is estimated, however, that a minimum of seventeen (17) ground water extraction wells pumping a minimum total of 874 gallons per minute will be required. Approximate locations for the extraction well network is shown in the FS report. It is estimated that a minimum of seven (7) air strippers with packing and potentially secondary off-gas equipment will be required to treat the water to MCLs prior to disposal. As discussed, there are two disposal options under consideration. If the reinjection disposal option is selected, over 3200 feet of injection galleries, 3900 feet of connecting pipe, 13,600 feet of distribution header, and six pumps are required. If the water reuse option is selected, a treated water transmission line would have to be designed, installed and tested to convey treated water from the site to the City's water treatment plant. In addition to monitoring the extraction wells, approximately ten (10) compliance monitoring wells would be installed and sampled on a quarterly basis to determine the effectiveness of the remedial system.

The estimated total costs of the selected interim ground water remedial system ranges between 10 to 17 million dollars, dependent upon the disposal option used and the requirement for secondary treatment of off-gas. Total costs include capital costs and operation and maintenance costs at a five (5) percent discount rate for an operational life of 25 years.

8.0 ADDITIONAL RECOMMENDED ACTIONS

KDHE recommends the following additional actions be implemented at the site in conjunction with the Remedial Design phase of the selected interim ground water remedial alternative. The need for additional actions was determined during completion of the RI and evaluation of the RI/BRA/FS reports.

Adjustment of the Site Boundaries

Based upon the RI investigation, an adjustment of the site boundaries is required to better define the Gilbert and Mosley Site. Ground water contamination exists outside the current site boundary in at least three locations: 1) PCE contaminated ground water is entering the northeast portion of the Site in the area between 1st Street and Central and Wabash and Indiana, 2) TCE contaminated ground water is migrating off-site at the east-central boundary of the Site in the area between Osie and Boston and Lulu and Greenwood, and 3) TCE contaminated ground water is migrating off-site in the southeast portion of the Site in the area near Wassal and Madison. The new boundaries for the Gilbert and Mosley Site are shown in Figure 9.

Source Area Identification

Additional investigations should be conducted to determine source areas and potentially responsible parties for the ground water contamination. The City has initiated an information request letter mailing to possible sources within the Site. Upon review of the submitted information, the City will attempt to negotiate with the identified party for source investigation. If the City is unsuccessful in negotiations, KDHE will proceed with enforcement actions or the City will proceed with further investigation to document source areas. The City's investigation will consist of procedures outlined and approved in the RI report. Source areas identified during additional investigations will be evaluated by KDHE to determine if source control activities are necessary. Future source control activities will be coordinated with the selected interim ground water remedial alternative outlined in this CAD to insure that a final remedial action is protective of health and the environment.

Long Term Pumping Tests

As part of the Remedial Design phase of the selected alternative, long-term pumping tests (>72 hours) should be conducted in each of the general extraction areas to more accurately predict aquifer response for design considerations.

Additional Indoor Air Sampling

Additional indoor air sampling should be conducted to better quantify risk exposure for the area north of Kellogg. Sampling should be conducted in residences or businesses during several periods throughout the year to account for seasonal variations. Results of the air sampling will be evaluated by KDHE to determine if additional remedial actions are required at the Site.

In summary, the selected interim ground water remedial alternative is protective of human health and the environment, maintains protection over time and will decrease the volume and mobility of ground water contamination at the site.

9.0 COMMUNITY PARTICIPATION

A Community Relations Plan for the Gilbert and Mosley Site was approved by KDHE in November 1991. The Community Relations Plan lists governmental contacts for the Gilbert and Mosley Site. A technical advisory group and a citizens advisory committee has also been formed to provide input into the remediation of the site. The draft Corrective Action Decision document, RI/FS reports and other documents were made available for public review. A public comment period was held from June 6, 1994 to July 6, 1994 and a public meeting was held by KDHE on June 21, 1994. Public input and comment as been encouraged by KDHE and the City of Wichita throughout the process. Notice of the Draft Corrective Action Decision and public meeting was published in the Wichita Eagle. All comments which were received by KDHE prior to the end of the public comment period, including those expressed verbally at the public meeting, are addressed in the Response to Comments Summary Section of this Final Corrective Action Decision.

10.0 DOCUMENTATION OF SIGNIFICANT CHANGES

KDHE has reviewed all written and verbal comments submitted during the public comment period. There are several significant changes to the interim remedial action, as it was originally identified in the Draft CAD, that were necessary. The significant changes are as follows:

KDHE has modified the original monitoring frequency from "quarterly for the first two years" to "quarterly or other monitoring frequency as determined by KDHE". This modification allows KDHE to adjust the monitoring frequency (increase or decrease) based upon past monitoring events.

KDHE has modified the discussion of disposal of treated water to indicate "the treated water would be directed to a benefical use" instead of limiting use to the City's water treatment plant.

KDHE has modified long term monitoring requirements to include monitoring at compliance and selected monitoring wells. The original language limited long term monitoring to compliance wells only.

No other significant changes to the Final CAD were necessary. KDHE has noted and made several typographical modifications to the Draft CAD.

KDHE has also concluded that a workshop to discuss risk assessment, risk management and bioremediation will be held for the public in October 1994 at the Wichita City Hall. A formal announcement of the meeting time and place will be provided to the news media and public at least a week in advance. The workshop will be educational and informative in an attempt to help the general public understand the risks associated with the site. The workshop is not considered part of the public education program to be implemented by the City of Wichita as part of the selected interim remedial action.

11.0 RESPONSE TO COMMENTS SUMMARY

The purpose of this Response to Comments Summary is to summarize the comments made by private citizens and other interested parties during the public comment period and at the Public Hearing for the draft Corrective Action Decision for Interim Ground Water Remediation at the Gilbert and Mosley site, Wichita, Kansas. Those persons commenting on the draft Corrective Action Decision are listed in Attachment IV. The Response to Comments Summary also summarizes the Kansas Department of Health and Environment's (KDHE) responses to those public comments. The draft Correction Action Decision is KDHE's proposed plan for an interim remedial action to address contaminated ground water present in the area known as the Gilbert and Mosley site.

Copies of individual comment letters and the official transcript of the public hearing are available for public review in the Administrative Record file. The comment period transpired from June 6, 1994 to July 6, 1994. The comments are categorized as general comments and specific comments.

General Comments/Responses

Introduction

The KDHE received numerous comments, both positive and negative, concerning four general issues -- 1) the use of Alternate Clean-up Levels (ACLs); 2) reuse of treated water for drinking water purposes; 3) the use of treatment devices for the air emitted from the ground water treatment system; and 4) the use of bioremediation. KDHE has collectively grouped public comments pertaining to the four general issues described above. This section of the Response to Comments Summary will provide responses to address each of the four issues.

KDHE also received numerous comments pertaining to the Tax Increment Financing (TIF) District. These comments are not related to the Corrective Action Decision; therefore, KDHE has not provided a response. Comments received on the TIF have been forwarded to the City of Wichita for response. Any future questions concerning the TIF should be directed to the City of Wichita.

1. Use of Alternate Clean-up Levels (ACLs) rather than Maximum Contaminant Levels (MCLs)

General Comment: Twenty public comments were received by KDHE concerning the use of ACLs. Fifty-five percent of those comments were opposed to the use of ACLs and forty-five percent were in favor. Some community members commented that using ACLs as the clean-up goal for the Gilbert and Mosley site was unacceptable and the ground water should be remediated to federal drinking water standards or MCLs. Other community members commented that the ACLs would be protective of public health and environment and indicated that they believed achieving MCLs would be unnecessary and cost prohibitive.

General Response: Alternate Cleanup Levels (ACLs) can be substituted as clean-up standards for federal drinking water standards (MCLs) if they are demonstrated to be adequately protective of human health and the environment. The calculation of ACLs employs a human health-based methodology incorporating margins of safety by using assumptions which are inherently conservative. The ACLs are either the chemical-specific 1-in-100,000 excess carcinogenic risk concentrations or the federal drinking water standards, whichever are greater. The ACLs can be viewed as a one-in-100,000 (1×10^{-5}) potential increase in the risk of developing cancer for an adult weighing approximately 155 pounds who drinks 1/2 gallon of water and takes one shower every day for the next 30 years with water containing contaminants at concentrations equal to the ACL levels. Since no one is drinking or showering with the contaminated water from Gilbert and Mosley, this potential risk is hypothetical and conservative. The ACLs were calculated from data collected during the Remedial Investigation and Baseline Risk Assessment of the Gilbert and Mosley site and from other toxicological studies.

The term "maximum contaminant level" (MCL) refers to the maximum permissible level of a contaminant in water **which is delivered to any user of a public water supply system.** MCLs are chemical-specific standards established under the federal Safe Drinking Water Act which take into account human health considerations as well as the economic and technological feasibility of reducing contaminant concentrations in drinking water. These standards were derived using the identical human health risk-based methodology employed to derive KDHE's proposed ACLs. Chemical-specific MCLs are calculated to fall within the range of 1-in-10,000 to 1-in-1,000,000 people having an increased likelihood of developing cancer as a result of consuming approximately 1/2 gallon of water per day for 30 years. Since site parameters vary, MCLs may need to be modified prior to application to specific sites due to health, environmental, technical and economic feasibility considerations.

A direct comparison of MCLs and ACLs for the contaminants of concern at the Gilbert and Mosley site indicates five of the seven contaminants of concern are set at the federal MCLs. Only the ACLs for trichloroethene (TCE) and tetrachloroethene (PCE) are greater than their MCLs. However, the ACLs for TCE and PCE do fall within EPA's acceptable range of risk and are protective of human health.

Additionally, the ACLs were used by KDHE to define the areas of ground water contamination that require active cleanup through treatment units; however, **it is important to realize that the entire Gilbert and Mosley area will be cleaned up to federal drinking water standards (MCLs) through a combination of natural processes and treatment technologies.** The cleanup technology employed at the Gilbert and Mosley site would essentially be the same regardless of the use of ACLs or MCLs as cleanup standards; the significant difference is how long the remediation effort will continue and how much the remediation will cost.

The major component of the proposed remedial plan is the pumping of the impacted ground water out of the ground. This pumping will accomplish two important tasks. First, by pumping water from strategic locations, an area of control, commonly known as a "cone of depression", will be created which will direct the movement of the ground water toward the pump instead of allowing the water to move naturally (south) towards unimpacted private and public water supply wells. For this reason, pumping water from the Gilbert and Mosley site is necessary in order to assure that downgradient unimpacted ground water will not be affected in the future by contamination from the Gilbert and Mosley site. This principle is called hydraulic containment.

Secondly, pumping brings contaminated ground water to the surface where it can be cleaned prior to discharging it in order to avoid spreading the contamination. The water is cleaned or treated by directing it through an air stripper which can remove volatile contaminants to levels below MCLs or other appropriate standards. At the same time the pump and treat system will be in use, natural processes will be slowly breaking down the contaminants. These natural processes can occur through biological means, where organisms help to process and break down the contaminants, or through chemical processes where compounds naturally degrade to other compounds.

As an additional safeguard a series of compliance monitoring wells will be established at the boundary of the Gilbert and Mosley site to insure that contamination is contained. If

contamination exceeding the federal drinking water standards (MCLs) is detected at the compliance points additional preventive remediation would be required.

KDHE has documented that the use of the ACLs generated for the Gilbert and Mosley site is protective of human health. Additionally, the use of ACLs is cost effective and will provide a more efficient overall cleanup of the Gilbert and Mosley site. Therefore, the use of ACLs will not be modified in the CAD; however, KDHE will sponsor a workshop to help the public to better understand risk associated with the site and the use of cleanup standards such as ACLs and MCLs.

2. **Beneficial Reuse of Remediated Ground Water**

General Comment: Nineteen public comments received by KDHE made reference to the proposal to reuse the treated water recovered from the Gilbert and Mosley site. Fifty-eight percent of those comments were in favor of reusing the water for beneficial purposes; forty-two percent were opposed to reuse as drinking water.

General Response: A majority of those commentors who opposed the reuse option were concerned with the risk associated with drinking treated water. Additionally, many of the commentors were confused as to whether contaminated water would be treated to ACLs or MCLs prior to reuse. To clarify the issue KDHE provides the following response on the treatment and reuse of contaminated water.

All contaminated water for reuse as drinking water will be initially treated by air strippers to levels below the federal drinking water standards (MCLs), (i.e. treated water will be within acceptable risk levels following treatment by the air stripper). After treatment by air strippers and reduction of contamination to acceptable levels the treated water will be piped directly to Wichita's Water Treatment Plant (WWTP). There it will be blended with the raw, uncontaminated water coming from Cheney Reservoir and wells located in the Equus Beds near Halstead, Kansas. Currently, the WWTP processes approximately 60 to 62 million gallons of water per day, and is being upgraded so that in the near future it will have the capacity to process approximately 160 million gallons per day. After water from the Gilbert and Mosley project has been treated by air strippers and mixed with large volumes of uncontaminated water it will go through the WWTP for additional treatment and be recombined for distribution from one pump station to all residents. The amount of treated water from the Gilbert and Mosley site which could be added to the City's raw water supply would equal approximately two to six percent of the City's current average daily usage. In addition, the City of Wichita would be required to monitor water from the WWTP prior to distribution to ensure that safe and uncontaminated drinking water is provided to the public.

The beneficial reuse of treated contaminated water has been done successfully in McPherson, Kansas and several other cities in Kansas and across the nation. The reuse option is a safe and cost effective way to reuse this precious resource. With the shortages of potable water in Kansas, and the City of Wichita's need for additional drinking water supplies, the reuse option remains a valid alternative.

KDHE would also support other beneficial reuse options of the recovered and treated water from the Gilbert and Mosley site such as reuse for industrial and irrigation purposes. A study conducted in 1992 suggested there were five potential large water users that could utilize non-potable water from the Gilbert and Mosley site; however, their combined need at the time of the study was less than 20 percent of the total volume of water which must be recovered from the Gilbert and Mosley site to sustain hydraulic containment.

In summary, contaminated water from the Gilbert and Mosley site used for drinking water would be treated to drinking water standards, then diluted by mixing with other water sources, and finally retreated prior to distribution. Therefore, all water distributed to residents of the City of Wichita would meet or exceed national drinking water standards. In addition, a monitoring program would be implemented to insure that all drinking water met appropriate standards. Other beneficial uses of the water would also be acceptable. KDHE will modify the CAD to include any beneficial uses of the water. The final reuse option will be incorporated into the Remedial Design phase of the project. The workshop discussed in Response #1 will also help the public to better understand the process of treating contaminated water for reuse.

3. **Air Emissions**

General Comment: Nine of the public comments voice concerns about the amount of VOCs which would be released into the air by the air strippers removing contaminants from the water. Of these nine, four stated carbon filters should be required, two felt the filters should not be required, and three requested additional information on the concentrations of contaminants which would be released to air and their associated hazards.

General Response: Final risk calculations associated with air emissions are currently not available primarily because the amount of VOCs released from the water to the air during air stripping will differ based on variables such as the location of the recovery wells, the concentration of contaminants in the ground water, and the rate of pumping. The need to treat air from the air strippers with carbon filters or other devices will be assessed during the Remedial Design phase and will be based on actual data from the remediation system. The assessment will involve a site specific dispersion model and associated risk evaluation. Emissions commonly referred to as "off-gas" from the air strippers will also be monitored initially to determine if air treatment is necessary. The off-gas will be required to meet all Kansas Air Pollution Emission Control Regulations. These regulations are protective of health and the environment; consequently, no modification to the CAD is required.

4. **Bioremediation**

General Comment: Of the six comments received about performing a bioremediation pilot study on the Gilbert and Mosley site, three were in favor of bioremediation if it is effective, one was generally opposed, one was opposed on the basis that the bacteria could potentially have unforeseen affects on the environment, and one was opposed to spending money on research rather than proven remedial methods.

General Response: Bioremediation is not a totally new and unproven technology. In many environments there are native microbes or bacteria which promote and accelerate the degradation of soil and ground water contamination. The presence of these microbial populations is based on many variables such as pH, temperature, types of nutrients, and chemistry. The size of these microbial populations is often based on the quantity of nutrients and/or contaminants present. Studies have shown that natural bioremediation may be enhanced by increasing the quantity or type of nutrients available to the microorganisms. This will often increase their productivity and subsequently increase the rate of contaminant degradation. The pilot study proposed in the CAD would evaluate the pertinent details in the study area such as what organisms are naturally present and their nutrient requirements are. Based on this information, appropriate nutrients and/or additional bacteria could be introduced to a specific area where the progress of the microbial degradation could be measured and evaluated. The bacteria which might be added to the aquifer would be similar to the native organisms but potentially more effective at degrading the compounds present at the Gilbert and Mosley site.

Several organisms have been developed by the United States Environmental Protection Agency (USEPA)/Gulf Breeze Laboratory to increase the degradation of certain chlorinated organic contaminants. The organism proposed for testing at the Gilbert and Mosley site is known as PR1 and was developed by the USEPA. The Gilbert and Mosley site is an ideal site for the testing and potential use of PR1 due to the high porosity of the subsurface, the presence of shallow contamination and the relatively low level of adsorption of contaminants to soil particles in the contaminated areas.

Because of its potential beneficial impact, the pilot test would be partially funded by the EPA and the United States Air Force. The University of West Florida would also be directly involved in certain aspects of the testing. The bioremediation testing will be performed in several phases to determine the feasibility of going forward with the full-scale field test. This approach will save time and money and will allow complete evaluation of the laboratory data prior to investing additional money if the laboratory phase does not prove feasible. If the field test indicates that bioremedial enhancement is effectively increasing the degradation rate of the chlorinated organic contaminants, the bioremediation system would be expanded to other areas of the site in order to decrease the total time required for remediation. If at any point the testing indicates that bioremediation is not applicable, then the reuse option would be implemented.

Specific Comments/Responses

Introduction

The following section is KDHE's response to specific comments received from individuals during the Public Hearing on June 21, 1994 and during the thirty day public comment period held from June 6 to July 6, 1994. Each citizen's comments or questions are grouped together by number below. Each pertinent comment has been summarized and is followed by KDHE's response. Comments not pertinent or specifically related to the remedial action proposed in the Gilbert and Mosley Corrective Action Decision have not been addressed. Numerous comments were received pertaining to the Tax Increment Financing District and Certificate of Release Program. These comments have been referred to the City of Wichita for response.

WRITTEN COMMENTS

1a. Comment: A commentor asked what the residence times were for industrial solvents like those contaminating the ground water in the Gilbert and Mosley area.

Response: The residence times for industrial solvents such as trichloroethene and tetrachloroethene in ground water vary depending on the compound, the concentration of the compound, and the physical, chemical and biological conditions of the aquifer. Industrial solvents can degrade through biotic (biological) and abiotic (nonbiological) or chemical processes. Degradation of a compound is measured in half-life which is defined as the time necessary for one half of the concentration of the compound to be degraded under ideal conditions (i.e. a compound with an initial concentration of 100 parts per billion (ppb) and a half-life of ten days would have a concentration of 50 ppb after ten days, 25 ppb after 20 days, 12.5 ppb after 30 days...). Laboratory studies have suggested ranges of half-lives for the compounds identified in the Gilbert and Mosley area. A range of the biotic and abiotic half-lives for three of the major compounds detected at the Gilbert and Mosley site are listed below.

Compound	Biotic	Abiotic
trichloroethene	33 to 230 days	.89 to 4.5 yrs
tetrachloroethene	34 days to 2 yrs	.73 to 2 yrs
vinyl chloride	60 days to 7.9 yrs	< 10 yrs

1b. Comment: The commentor asked whether residents of Derby should be concerned about the spread of contamination from the Downtown Wichita area.

Response: Once the selected remedial alternative has been implemented, the ground water contamination will be controlled through hydraulic containment. Downgradient compliance monitoring points will be established to insure that contamination does not migrate to unimpacted areas. Therefore, residents of Derby should not be concerned about the migration of contaminants from Gilbert and Mosley. Additional discussion of this topic is included in Section 1 of the General Responses.

1c. Comment: The commentor referred to the newspaper article, "Pollution Cleanup Shrinks", and commented that the reuse option of mixing treated water containing traces of solvents with drinking water alarms her. The commentor requests that KDHE define "negligible risk".

Response: Discussion of this topic is addressed in Section 2 of the General Responses. The selected remedial alternative states that all contaminated water will be treated to drinking water standards, then mixed with uncontaminated drinking water and treated again. The phrase negligible risk, as used in the referenced article, was meant to indicate that since the treated water will meet federal drinking water standards, it will pose no greater risk than allowed by the State of Kansas for any other public water supply system.

1d. Comment: The commentor asked what amount of volatile chemicals would end up in the air we breathe if the air stripping process is implemented.

Response: Discussion of this topic is addressed in Section 3 of the General Responses.

2. Comment: The commentor requested that KDHE not allow treated ground water with traces of cancer causing chemicals to be added to their water supply.

Response: Discussion of this topic is addressed in Section 2 of the General Responses and Specific Response 1c. Treated water used as part of Wichita's drinking water supply, will meet or exceed federal drinking water standards.

3. Comment: The commentor stated that she wanted total cleanup of the contaminated water supply and stated that "drinking water isn't pure so don't make it worse".

Response: Discussion of this topic is addressed in Section 2 of the General Responses and Specific Response 1c.

4. Comment: The commentor stated that KDHE's proposed plan for partial cleanup of the contaminated ground water is grossly irresponsible and a "blatant play for special interest." The commentor requests that the plan be reconsidered and that the polluters be made to clean-up their mess.

Response: The remedial plan proposed in the CAD is for total cleanup of contaminated ground water at the Gilbert and Mosley site. For the purpose of this response, KDHE assumes that the idea of a partial cleanup refers to the use of ACLs rather than MCLs. Compliance wells located around the site will be tested to insure that contamination above MCLs does not leave the site boundaries. ACLs will be one of the criteria used to determine where active pump and treat remedial technology will be applied within the site and how long the pump and treat system will operate. Additional discussion concerning ACLs and MCLs is provided in Section 1 of the General Responses. KDHE uses the same criteria to evaluate and select remedial alternatives for all contaminated sites in Kansas. Additional actions defined by the CAD includes the identification of responsible parties. The responsibility and financial liability for conducting source control (cleanup) activities will be that of the responsible parties.

5. Comment: The commentor indicated opposition to the CAD and commented, "If this contaminated water is not cleaned up to drinking water standards, then what is the purpose of a clean-up?"

Response: Discussion of this topic is included in Section 1 of the General Responses.

6a. Comment: The commentor questioned the 30 year exposure interval used for calculations in the Baseline Risk Assessment. The commentor assumed the 30-year interval was based on the estimated time for completion of the Gilbert and Mosley remediation, and felt that additional time should be included to account for potential past exposure prior to discovery and remediation of the site.

Response: The 30-year value is the standard or default value used for exposure duration by the EPA in Baseline Risk Assessment calculations as defined by the USEPA Guidance Document entitled, "Risk Assessment Guidance for Superfund; Volume 1; Human Health Evaluation Manual (Part A)". This number is based on the conservative assumption that a resident will live in the same home for 30 years. This value is presented as the 90th-percentile for time spent at one residence, meaning that in a study done on residence times, only 10 percent of the residents lived in one location for longer than 30 years.

6b. Comment: The commentor states that it is difficult to imagine how an ordinance limiting the use of ground water at the site could be enforced. The commentor also states that long term exposure to outdoor water use such as children playing in sprinklers could become liability issues for the city in the future.

Response: Since the ordinance has not been developed or approved by the City Council, KDHE cannot provide specific details on the method of enforcement. The ordinance would be directed at prohibiting the connection of new private water wells for private or public drinking water purposes and might be enforced through a city inspection program and with the assistance of water service or water well contractors. Public education programs could also play a role in discouraging improper use of ground water in the site area.

The compounds of concern (COCs) at the site volatilize and disperse readily when exposed to the atmosphere; therefore, potential exposure from outdoor water use such as backyard pools or lawn sprinklers is very low as documented by the approved Risk Assessment. Plants irrigated with contaminated ground water are unlikely to accumulate the COCs because the compounds have high solubilities and vapor pressures which make them unlikely to adhere to or dissolve into plant tissues. Many plants also have the ability to metabolize most of the compounds of potential concern if necessary.

6c. Comment: The commentor states that in the CAD there is no proposed alternative to simply contain the water. The commentor states that if the ground water is not cleaned to drinking water standards, it will be contaminated forever; and therefore, simple containment might be a better alternative than partially cleaning the water and subsequently releasing contaminants to the air.

Response: The use of ACLs does not mean that the ground water will be contaminated "forever". The CAD proposes that the ground water in the Gilbert and Mosley area be remediated to MCLs through a combination of natural and technological means where ground water above ACLs will be targeted for active, technological remediation. An option to contain the contaminated ground water was evaluated during the Feasibility Study. The containment option involved the use of a vertical barrier (i.e. slurry wall) and extraction/reinjection wells to prevent migration around the barrier. During the Feasibility Study this alternative was rejected in favor of the options set forth in the CAD because the evaluation indicated it would be more expensive to implement and did not meet the effectiveness criteria as well as other, less expensive options. Details of this decision are set forth in Section 4 of the Gilbert and Mosley site Feasibility Study which is part of the Administrative Record file available at the KDHE offices in Topeka and Wichita or at the Wichita-Sedgwick County Health Department.

6d. Comment: The commentor suggested that the location of the extraction wells in the preferred alternative plan may not be sufficient to protect against migration from the site in the southwestern corner since the majority of the wells are located north of Lincoln street.

Response: The location of the extraction wells in the Feasibility Study are proposed locations. Details of the final remedial system, including the number, location and pumping capacity of extraction wells and air strippers, will be determined during the Remedial Design phase. The Remedial Design phase will include long-term pumping tests in order to predict aquifer response and determine what will be necessary to achieve containment. Other pumping wells which do not appear in the Feasibility Study, such as source control wells at individual facilities, may also be utilized for total site containment. One of the primary goals of the CAD is to contain the contamination within the Gilbert and Mosley site boundaries; the extraction well network will be designed to accomplish this goal. Compliance wells located at zero lines (areas below MCLs) or site boundaries will be monitored to insure containment is achieved and maintained.

6e. Comment: The commentor stated that reinjection of remediated ground water to introduce microbes for bioremediation would be a benificial use of the water; however, if the pilot study proves unsuccessful, the commentor feels reinjection of water which has acheived MCLs would be wasteful of a precious resource. The commentor feels that some above-ground use should be made of the remediated water rather than recontaminating it by reinjection.

Response: KDHE agrees that the remediated water should be put to a benificial use and has proposed options such as industrial use and/or blending with raw water for use in the public water supply system (see Section 2 of the General Responses). However, if it is not possible to use these alternatives, reinjection through injection galleries would not constitute a "waste" of the remediated water. The injection galleries would be located so that the reinjected water is used to flush contaminants from the soil and thereby increase the rate of soil remediation. Though reinjecting would initially recontaminate the treated water, it would eventially be recyled through the remedial system and acted upon by natural processes until all the water within the site was remediated.

6f. Comment: The commentor provided rough calculations of TCE air emissions based on the information in the CAD. The commentor's calculations suggest a minimum of 380 lb/year TCE and a maximum of 152,000 lb/year TCE would be released into the air from the proposed Gilbert and Mosley remedial system. This would be in addition to TCE emissions from companies within the site. The commentor indicates that the estimates only include TCE and not the other contaminants which will also be released into the air. The commentor states that the proposed plan does not consider possible toxic effects of mixtures of contaminants.

Response: Air emissions from the Gilbert and Mosley site will be calculated from actual data from the remedial system. The sum of emissions of all contaminants will be required to meet Kansas Air Pollution Emission Control Regulations (see Section 3 of the General Responses).

6g. Comment: The commentor asked if winter temperatures will negatively effect emissions from the air strippers, specifically by producing fog from water vapor or smog from VOCs that don't dissipate.

Response: The amount of water vapor produced from an air stripper would be roughly comparable to that produced from the heating system of a large office building and therefore unlikely to produce a significant fog problem. The dissipation of VOCs can be controlled or adjusted by regulating the amount of air flow through the stripper or by using filters. Specifications for the air strippers will be determined during the Remedial Design phase of work and will take seasonal variations into consideration. All emissions, during all weather conditions, will be required to meet Kansas Air Pollution Emission Control Regulations.

6h. Comment: The commentor asks if costs for the additional investigation into source areas proposed in the CAD are included in the current cost estimates.

Response: Additional source area investigation is not included in the estimated total costs of the preferred interim ground water remedial system set forth in the CAD. The responsibility and financial liability of conducting source control (clean up) activities will be that of the responsible parties. This will include the costs for identification and investigation of the source.

7a. Comment: The commentor stated, "It is important that the public recognize that the proposed clean-up plan is an interim measure subject to further investigative efforts by the City and the KDHE to identify all the passive and active sources of the contamination."

Response: KDHE agrees with this comment and refers the commentor to the CAD and official transcript from the public meeting. Page iii of the CAD states, "The draft CAD describes and discusses KDHE's preferred alternative for **interim** ground water remediation. Additional investigation of source areas and source control, if necessary, will be implemented as part of the CAD."; page 13 of the CAD states, "Individual source control activities must be established at all identified source areas to eliminate and/or reduce the toxicity, mobility and volume of waste/contaminant at the site."; and page 14 of the CAD discusses Source Area Identification. At the public meeting KDHE made the following statement: "Again, this is an interim action meaning that further investigation and cleanup will be required by the PRPs in identified source areas. The responsibility and liability of conducting source control activities will be that of the PRPs or responsible parties."

7b. Comment: The commentor stated,"The Risk Assessment that was developed in the RI/FS concluded that the public health is not at risk provided that the clean-up is implemented, institutional controls are developed, and a program to educate the public on minimizing or preventing exposure to contaminated ground water is implemented."

Response: No reponse is necessary.

7c. Comment: The commentor supports KDHE's decision to allow for an appropriate re-use of the recovered ground water.

Response: Beneficial reuse of once-contaminated ground water is becoming a more common practice across the nation. As our water supplies decline other innovative uses will be explored.

7d. Comment: The commentor states that KDHE's CAD is realistic, flexible and innovative.

Response: KDHE would add that the CAD provides adequate protection of human health and the environment.

7e. Comment: The commentor is supportive of ACLs and states, "the goal will be to remediate 100% of the contaminated ground water area to KDHE's remediation requirements."

Response: No response is necessary.

7f. Comment: The commentor noted a typographical error on page 12, paragraph 2, second sentence "5A should be changed to 5B".

Response: KDHE has modified the CAD.

7g. Comment: The commentor notes that clarification is needed regarding treatment of the "off-gas" from the air strippers. The commentor states, "The language in this item should be amended so that, if secondary treatment is considered, any acceptable technology be allowed and not be restricted to secondary treatment by carbon filters."

Response: As noted in Section 3 of the General Responses, final risk calculations will not be available until the Remedial Design phase. The need to treat the emissions from the air strippers with carbon filters or other devices will be assessed by KDHE Bureau of Air Quality.

7h. Comment: The commentor recommends that compliance monitoring wells within the boundary of the site be monitored on a quarterly basis for the first two years after which the frequency of monitoring will be determined by KDHE.

Response: KDHE will evaluate the monitoring frequency throughout the project; if it is determined that more or less frequent monitoring is required KDHE will modify the monitoring schedule. Consequently, KDHE will modify the CAD to read (page 13) - "...to monitor on a quarterly basis or other frequency as determined by KDHE."

7i. The commentor refers to the following statement in the CAD, "if monitoring wells exceed the federal MCLs, additional remediation would be required...." and notes that the statement appears to be inconsistent with the requirement that remediation is only required at concentrations above the ACLs.

Response: Discussion of this topic is addressed in Section 1 of the General Responses. To reiterate, the goal is to remediate the Gilbert and Mosley site to MCLs through treatment technologies and natural processes while containing contamination on-site so that downgradient ambient ground water is unimpacted.

7j. Comment: The commentor asks to clarify the 10 year monitoring requirement stating that 5 year monitoring is the more common requirement at contaminated sites.

Response: The five year monitoring requirement is commonly used at sites remediated with active manmade treatment to MCLs. However, since the selected alternative will actively treat ground water to ACLs and passively treat (via biodegradation) it to MCLs, the monitoring requirement was increased to ten years. Therefore, KDHE will not modify the CAD.

7k. Comment: The commentor asks to clarify that source control should be the responsibility of the polluter.

Response: Refer to comment 7a.

7l. Comment: The commentor notes that on page 13, paragraph 6 the statement, "then treated water would be directed to the City's water treatment plant ...." should be changed to "then treated water would be directed to a beneficial use."

Response: KDHE will incorporate the suggested language in the CAD.

7m. Comment: The commentor states that on page 13, last paragraph the text should indicate that the exact number of extraction wells and pumping rates will be determined during the Remedial Design phase.

Response: On page 13, the CAD does state that the "exact design of the preferred interim ground water remedial system will be detailed during the Remedial Design phase." Therefore, KDHE will not modify the CAD.

7n. Comment: The commentor would like to add the following statement, "During the Remedial Design, if certain beneficial uses for treated water are not feasible, discharge to the POTW or Arkansas River should be considered as discharge options."

Response: Discharge options such as discharge to the POTW and/or to the Arkansas River were evaluated during the Feasibility Study. KDHE strongly supports the beneficial reuse of ground water. The Feasibility Study documented the various disposal options. However, modification to the final CAD and subsequent public comment would be required after the Remedial Design phase if reinjection or beneficial reuse of ground water is determined to be impracticable or unfeasible. Therefore, KDHE will not modify the CAD.

7o. Comment: The commentor states that requiring a pumping test in each of the extraction areas appears excessive.

Response: KDHE agrees and will modify the CAD to read "in each of the general extraction areas".

7p. Comment: The commentor states that the public comment period provided on page 15 is incorrect.

Response: KDHE agrees and will make the appropriate modifications.

8a. Comment: The commentor requested that KDHE define "negligible risk".

Response: Discussion of this topic is addressed in Specific Response 1c.

8b. Comment: The commentor asks, "why has KDHE not yet calculated the risk to residents of allowing the contamination to escape into the air?"

Response: Discussion of this topic is addressed in Section 3 of the General Responses and Specific Response 7g.

9. Comment: The commentor stated that the EPA should have been involved from the start of the project.

Response: The EPA has been aware of and peripherally involved with, the Gilbert and Mosley site from the beginning. The EPA approves of KDHE as the active regulatory agency for the Gilbert and Mosley site and also performs technical review of all Gilbert and Mosley site documents.

10. Comment: The commentor expressed support for the use of ACLs and for utilizing treated water for benificial purposes. The commentor stated that, "the proposed draft Corrective Action is a realistic, practical and environmentally sound solution to remedy contamination at the Gilbert and Mosley area."

Response: No response is necessary.

11a. Comment: The commentor stated that the ground water should be brought back to safe drinking water standards for people and wild life.

Response: Discussion of this topic is included in Section 1 of the General Responses.

11b. Comment: The commentor stated that if money isn't available from other sources, the State and Federal governments should be monetarily responsible for the clean-up.

Response: Both state and federal law make the responsible party and/or current landowner finacially liable for remediation of contamination. The City of Wichita has stepped forward as a voluntary party to address the interim ground water remediation and to identify those parties responsible for causing the contamination. The voluntary effort by the City to address the Gilbert and Mosley site has warded off intervention by the federal Superfund Program. The State of Kansas does not currently have funding to address such contamination.

12. Comment: The commentor stated that the use of ACLs is appropriate for this site and the proposed approach allows the treated water to be used for beneficial purposes. He stated that the proposed Corrective Action provides a cost effective and innovative method for clean-up of the contamination, and stated that since there is virtually no exposure to the public, it provides a realistic solution.

Response: No response is necessary.

13. Comment: The commentor stated that he has been associated with the Gilbert and Mosley matter since working on the Tax Increment Finance proposal and now writes in strong support of KDHE's proposed action outlined in the Gilbert and Mosley CAD. He supports the use of ACLs and the plan's containment procedures to prevent further migration of contaminants. He indicates the plan is "not only environmentally thorough and responsible, but also a cost effective and practical approach to an issue of vital importance to the Wichita community".

Response: No response is necessary.

14a. Comment: A commentor expressed opposition to using bacteria as part of the ground water remediation at the Gilbert and Mosley site unless or until technical information can be provided which assures the safety of its (the bacteria) use. He asks: 1) can the organisms live in other animals including humans, and 2) if necessary, how can the organisms be terminated.

Response: KDHE contacted experts who have studied the bacteria proposed for the bioremediation pilot study at the Gilbert & Mosley Site. According to the experts the organisms, which have been studied for ten years, have been found to occur naturally in certain environments. Like many other bacteria, including those already naturally present in the subsurface of the Gilbert & Mosley Site, these bacteria can live in or on other organisms; however, studies indicate the bacteria proposed to be introduced are not pathogenic to humans and therefore would not produce disease in humans or other animals. It is unlikely that these organisms would even 1come into contact with humans since, if used, they will be injected below the ground with the appropriate nutrients for them to degrade some of the contaminants in the ground water. When the food source for the bacteria is depleted or cut off, the bacteria will become dormant or die.

14b. Comment: The commentor asked how the public could have more access to the decision making process regarding this matter (the Gilbert and Mosley site).

Response: The City of Wichita established a technical advisory committee and a citizens' advisory committee to provide input for the Gilbert and Mosley project. Additionally, two public meetings were held by KDHE. An Administrative Record file is also available for public review. KDHE would suggest that those interested in participating in the citizens' advisory committee contact Mr. Jack Brown of the Wichita-Sedgwick County Health Department.

15a. Comment: The commentor stated that the contamination was a result of company owners trying to make a profit at the expense of citizens and employees, and city managers, commissioners and communuity leaders allowing this type of activity with complete disregard for public safety. He states that if the company owners want credit for their community projects, they should also take credit for the contamination they caused and pay to clean it up. The cleanup should be paid for by the 39 businesses that caused the contamination.

Response: The draft CAD recommends additional actions including source area investigation and identification of responsible parties (RP). Once identified, the RP is responsible for and financially liable for conducting source control (clean-up) activities. For further discussion please refer to Specific Response 6h.

15b. Comment: The commentor refers to a statement made in the newspaper article, Pollution Cleanup Shrinks", which said that 10% of the contaminated water would be pumped out of the aquifer and treated.
Response: The statement in the newspaper article is incorrect. The goal of the remedial project is to treat 100% of the contaminated water through both natural and technological methods.

15c. Comment: The commentor stated, "it does not make sense to clean up the water and then dump it back into a contaminated aquifer" because the water becomes recontaminated and the contaminated area continues to grow.

Response: If the pilot study on bioremediation indicates that enhancement is effective in decreasing the contamination, some of the water would be enhanced with oxygen and nutrients and reinjected into the aquifer in order to increase the projected cleanup rate through biological activity. The reinjection wells and galleries will be located in areas where reinjection would be beneficial in flushing contaminants from the soil. Reinjection would not increase the size of the contaminated area. Compliance wells will be located in strategic areas to make sure hydraulic containment is maintained and that the contamination is not spreading. (see Response 6e). However, if bioremediation enhancement is not applicable, KDHE has proposed beneficial reuse of the treated water.

15d. Comment: The commentor stated that since the water is contaminated enough to place consumption restrictions on it, it should be cleaned up now and not wait 60 years.

Response: KDHE agrees that the ground water contamination in the Gilbert and Mosley area should be cleaned up now and feels that the plan proposed in the CAD is the best method of accomplishing cleanup in the shortest amount of time relative to the cost of the proposed method (see Section one of the General Responses).

15e. Comment: The commentor stated "the aquifer should and needs to be cleaned up as thorough as can be and with complete assurance that it is safe when they get done".

Response: KDHE believes the CAD initiates cleanup of the Gilbert and Mosley site. Please refer to Section 1 of the General Responses.

16. Comment: The commentor alleged that asbestos is lying on the ground at the Great Plains Transportation Museum and is concerned that it could enter the local ground water. The commentor goes on the say that the material is "freely blown around the neighborhood".

Response: Asbestos is primarily a health hazard when it is inhaled. It is extremely difficult or impossible for a solid, non-soluble material such as asbestos to enter or negatively impact ground

water. The commentor's concern has been referred to the Asbestos Control Program in the KDHE Bureau of Air and Radiation.

17. Comment: The commentor stated that the use of ACLs appears to be appropriate, and "the incorporation of containment, bioremediation, re-use, clean-up of hot spots, institutional controls, education, and long term monitoring should achieve the containment of the contamination."

Response: No response is necessary.

18. Comment: The commentor refered to a newspaper article which stated that the ground water would be treated and added to the drinking water system and that the treatment would remove at least 98% of the contaminants. The commentor is concerned about the remaining 2% of contaminants that would go into the water supply and into the bodies of the population. The commentor asked what affect these chemicals will have on the people who consume them and stated that considering putting these chemicals in the water we drink and the air we breathe is a total lack of respect for human life. The commentor hopes KDHE will monitor a cleanup that will not be at the expense of human health.

Response: The treatment system will remove all of the compounds of concern to federal drinking water standards (MCLs). The percentage of contaminants removed will vary based on the concentrations originally present in the water; however, all water that is combined with the drinking water system will be treated to below federal drinking water standards prior to being blended with other raw water supplies. This topic is discussed in more detail in Section 2 of the General Responses. Any contaminants released into the air by the remedial system will be in compliance with Kansas Air Pollution Emission Control Regulations (see discussion in Section 3 of the General Responses) KDHE believes the proposed action is protective of health and environment and that its implementation will not pose a threat to human health.

19. Comment: The commentor stated that KDHE should add more cleanup areas to the proposed cleanup plan for the Gilbert and Mosley project, and that each area should have at least one water cleaning tower or air stripper.

Response: One of the recommended additional actions in the CAD is source area identification. The implementation of source control in newly identified source areas will, in effect, add additional remedial systems within the Gilbert and Mosley site. A sufficient number of air strippers will be installed to treat all contaminated ground water extracted from the site.

20a. Comment: The commentor stated that KDHE's preferred remedial alternative should be approved because they satisfy the objectives, eliminate the actual risks in the area, and are cost effective.

Response: No response is necessary.

20b. Comment: The commentor stated that the water reuse option should not be selected.

Response: KDHE has determined that the water reuse option will not be removed from the CAD since it is protective of health and the environment. Discussion on this topic is located in Section 2 of the General Responses.

PUBLIC HEARING COMMENTS:

21. Comment: The commentor supported the CAD for cleanup at the Gilbert and Mosley site.

Response: No response is necessary.

22a. Comment: The commentor supported the CAD and stated, "the proposal as outlined will indeed be protective of public health and protective of the environment".

Response: No response required.

22b. Comment: The commentor stated, "one caveat and that is as we come to the end of the cleanup we should continue monitoring. All too often throughout the United States sites like this have been found to undergo what is called rebound."

Response: The term "rebound" is used to describe the situation where contaminant concentrations increase after the remedial goals (ACLs) have been achieved and the remedial system is shut off. KDHE will monitor select wells and compliance wells for ten years after the remedial system is shut off. Discussion of this topic is included in Specific Response 7j.

23a. Comment: The commentor stated, "Without potable water Wichita would have no future; therefore, it is necessary and realistic, not idealistic, to demand that the cleanup of the pollution in the Mosley-Gilbert site meet EPA drinking water standards. KDHE's position of being, quote, flexible and innovative in accepting a lower standard for the water cleanup is not acceptable. Moreover, Wichita is both legally and morally responsible for not allowing pollution to move eventually down and contaminated Derby's drinking water wells.

Response: The City of Wichita currently obtains its drinking water from a well field located near Halstead, Kansas and from the Cheney Reservoir, located west of Wichita. Both of these sources of potable water are not and will never be impacted by contamination from the Gilbert and Mosley site. A response to the cleanup of the Gilbert and Mosley site and potential impact to Derby's drinking water wells is included in Section 1 of the General Responses and Specific Response 1b.

23b. Comment: The commentor stated, "Because in the pump and treat there would occur a trade off between clean water and clean air, it should be ruled that there be charcoal filters to catch the poisonous gases even though this would add to the cost of the cleanup.

Response: Discussion of this topic is included in Section 3 of the General Responses.

23c. Comment: The commentor stated, "The treated waters would still contain traces of TCE and PCE so it should not be mixed into our drinking water."

Response: Discussion of this topic is included in Section 2 of the General Responses.

24. Comment: The commentor recommended bringing in additional industry to use the water for refrigeration purposes, instead of using it for drinking water.

Response: The CAD supports any beneficial reuse of the treated water. Further discussion of this topic is included in Section 2 of the General Responses.

25. Comment: The commentor would like to see the treated water used in some manner since the City faces a potential water shortage in the future.

Response: KDHE agrees with this comment; further discussion of this topic is included in Section 2 of the General Responses.

26a. Comment: The commentor stated, "I agree that interim measures should be taken to minimize the spread of the contamination as long as containment does not become the goal rather than restoring ground water to a usable, drinkable substance."

Response: KDHE agrees with this comment; further discussion of this topic is included in Sections 1 and 2 of the General Responses.

26b. Comment: The commentor stated, "I think that the City should be required to incorporate into the City water system a portion of water that is cleaned to the level allowed by the KDHE."

Response: KDHE agrees with this comment; further discussion of this topic is included in Section 2 of the General Responses.

27. Comment: The commentor stated that ground water contamination at Gilbert and Mosley should not be cleaned up if the treated water can not be used as a drinking water source.

Response: Discussion of this topic is included in Section 2 of the General Responses.

28a. Comment: The commentor was concerned that there would be additional risk by allowing treated water into the public distribution system since all the "pipes will be running underneath the city and we have TCE as the primary probable carcinogen."

Response: There will be no additional risk to the citizens of Wichita by running treated water through the public distribution system. The contaminated ground water will be treated to federal drinking water standards prior to piping to the Wichita water treatment plant where additional treatment and mixing would occur. For further discussion refer to Section 2 of the General Responses.

28b. Comment: The commentor stated, "if we can not devise a plan and system that we clean up the water more than 10% of it over 25 years, and if we do not, if we can only clean up 10% of it, I don't understand what the benefit is."

Response: Refer to Specific Response 15b.

29a. Comment: The commentor stated,"The proposed remediation, I believe, does strike a workable compromise as long as the remediation effort is monitored very, very closely.....the idea of mixing partially remediated water with the drinking water supplies I find as frankly rather preposterous. It just doesn't make any sense to me. And I would as an individual be in opposition of that."

Response: As discussed,the cleanup of the Gilbert and Mosley site will be monitored throughout its duration including ten years after the cleanup goal is reached; for further discussion refer to Specific Response 7j.

Contaminated ground water at the Gilbert and Mosley site will be treated to federal drinking water standards prior to mixing with other water; for further discussion refer to Section 2 of the General Responses.

29b. Comment: The commentor states, "I believe the idea of not using additional filtration on the air strippers is a poor idea."

Response: Discussion of these topics are included in Section 3 of the General Responses and Specific Responses 6f and 7g.

30a. Comment: The commentor has concerns over using contaminated water for home gardening.

Response: Refer to Specific Response 6b.

30b. Comment: The commentor was opposed to the introduction of treated or untreated water into shared water supplies and to the release of air emissions without treatment.

Response: Discussion of these topics are included in Section 1, Section 2 and Section 3 of the General Resposnes.

31a. Comment: The commentor was concerned over the use of ACLs rather than Kansas Action Levels (KALs) to cleanup the Gilbert and Mosley site.

Response: The Kansas Action Levels are guidelines that have been used by KDHE for the cleanup of ground water sites across Kansas. The original intent for use of KALs was for the purpose of monitoring public drinking water supplies, not ground water cleanup. If a public water supply was sampled and found to have concentrations greater than the KAL, KDHE would notify the public water supply owner to either take the contaminated well out of service or to notify the public of the contamination. The KAL is equivalent in concentration to the corrresponding federal MCL, for those compounds for which an MCL has been adopted. Risk levels for KALs and MCLs generally range between 10^{-4} to 10^{-6}. As stated in previous responses the MCL is the same standard as the ACL for five of the seven chemicals of concern. Risk

levels for ACLs also fall between 10^{-4} to 10^{-6}. For additional discussion refer to Section 1 of the General Responses.

31b. Comment: The commentor was concerned over the risk associated with the use of private wells to water grass and gardens.

Response: Refer to Specific Response 6b.

31c. Comment: The commentor stated that the entire site should be cleaned up and that the cleanup goal should be KALs and not ACLs. The commentor stated, "I think you need to opt for at least 1 times 10 to the minus 5, which are KALs."

Response: The reference to KALs in Specific Comment 31c is inaccurate since the KALs generally range between 10^{-4} to 10^{-6} and are not set strictly at 10^{-5} as stated. The chemical-specific ACLs for the Gilbert and Mosley site are actually set at either 10^{-5} risk levels or the federal MCL. For further discussion please refer to Section 1 of the General Responses.

32. Comment: The commentor asked a question pertaining to the "arbitrary" boundary between the river and the site and the effects of the river on the contamination.

Response: The initial boundary for the Gilbert and Mosley site was determined during KDHE's Expanded site Investigation. The boundary was later confirmed as appropriate during the RI/FS. The Arkansas River located west and southwest of the site is the boundary which was based upon known ground water contamination.

The river may act as a hydrologic barrier for contaminants that are less dense than water (those contaminants that float on water) thus restricting their normal migration to the south. The river should not readily influence the contaminants that are more dense than water.

33. Comment: The commentor asked for the volume of water in the Gilbert and Mosley area and if remediation would deplete the water supply.

Response: The approximate volume of water at the Gilbert and Mosley site is greater than 2.75 billion gallons. Overall, the proposed remediation will not deplete the water supply. However, the pumping wells will create areas of control, commonly referred to as "cones of depression" where the water levels are temporarily reduced in the course of capturing the contamination.

34a. Comment: The commentor asked, "What concentration is predicted in water, in the drinking water, if the decision is made to add the treated ground water to drinking water."

Response: Ideally, the concentration predicted in the drinking water will be non-detectable; however, the system will be designed to treat water to meet the federal drinking water standards (MCLs).

34b. Comment: The commentor asked KDHE to define "negligible risk".

Response: Refer to Specific Response 1c.

34c. Comment: The commentor stated, "EPA has suggested that the risk of cancer may be increased at just four to five parts per billion of TCE and so it's troubling, as others have commented, that KDHE's numbers are higher."

Response: For discussion refer to Section 1 of the General Responses.

34d. Comment: The commentor had concerns about the calculation of risk from air emissions.

Response: Discussion of this topic is included in Section 3 of the General Responses.

35a. Comment: The commentor stated that the use of bioremediation as a cleanup alternative is "ridiculous" and technical data nationwide does not support its use; and as a consequence that no money should be spent on bioremediation.

Response: The CAD recommends a pilot test to determine if bioremediation technology is applicable at the site. If biological enhancement is not feasible then treated water would be used for beneficial uses. Further discussion of this topic is included in Section 4 of the General Responses.

35b. Comment: The commentor stated, "We should not concern ourselves with elimination into the air streams because the quantities would be de minimus."

Response: Discussion of this topic is included in Section 3 of the General Responses.

36a. Comment: The commentor asked if additional treatment will be "considered" or "required" if contamination is determined to be migrating out of the Gilbert and Mosley boundaries.

Response: KDHE will evaluate the compliance monitoring data to determine if the remedial system is effective. If it is determined that the remedial system is not effective then additional treatment will be required.

36b. Comment: The commentor was concerned that KDHE will not adequately review monitoring data from the compliance monitoring system.

Response: A KDHE project manager has been assigned to the Gilbert and Mosley site to insure that data is received, promptly evaluated and approved throughout the cleanup process. Information will be available for public review upon KDHE approval.

ATTACHMENT I

Comparison of MCLs, KALs and the Maximum Concentrations Detected at the Gilbert and Mosley Site for the Chemicals of Concern.

*all units in parts per billion

CONTAMINANT	MCLs	KALs	MAXIMUM CONCENTRATION DETECTED AT SITE
Trichloroethene	5.00	5.00	40000.00
Tetrachloroethene	5.00	5.00	3300.00
1,1-Dichloroethene	7.00	7.00	120.00
1,2-Dichloroethene	70.00	70.00	20018.00
Vinyl Chloride	2.00	2.00	12000.00
Trichloromethane	100.00	100.00	28.00
Benzene	5.00	5.00	4100.00

ATTACHMENT II

Comparison of MCLs, 10(-5) Chemical Specific Risk Levels, and KDHE's ACLs

*all units in parts per billion

CONTAMINANT	MCLs	10(-5) Chemical Specific Risk Levels	KDHE's ACLs
Trichloroethene	5.00	21.00	21.00
Tetrachloroethene	5.00	14.00	14.00
1,1-Dichloroethene	7.00	0.60	7.00
1,2-Dichloroethene*	70.00	36.50	70.00
Vinyl Chloride	2.00	0.25	2.00
Trichloromethane	100.00	2.00	100.00
Benzene	5.00	5.00	5.00

'*' - Not a carcinogen (based on a Hazard Index of 0.1)

ATTACHMENT III

Comparison and Evaluation of the Remedial Alternatives for the Gilbert and Mosley Site

ALTERNATIVE NUMBER	DESCRIPTION	OVERALL PROTECTIVENESS	CERCLA PROTECTIVE	LONG TERM EFFECTIVENESS AND PERMANENCE	REDUCTION OF MOBILITY, TOXICITY/VOLUME OF VOCS	SHORT TERM EF
.1	No Action	No reduction of risk	No	Does not stop migration of contaminants. Does not reduce the level of risk to public.	No reduction	Non
2	Limited Action	Minimal reduction of risk	No	Does not stop migration of contaminants. Minimally reduces the level of risk to public.	No reduction	Minimal - Public educ ground water restrict be implemented.
4A	10(-4) Extraction, Air Stripping and Reinjection	Reduces risk	Only 10 percent of ground water will be treated. Will be protective over time.	Only remediates high areas of contamination. Does not prevent migration. Reduces level of risk.	Reduces mobility, toxicity and volume of VOCs in the high areas of contamination.	Minimal - Drilling acti in the release of a mir of VOCs to air.
4B	10(-4) Extraction, Air Stripping and Reinjection with In Situ Bioremediation	Greatly reduces risk	Clean-up will meet 10 (-4) chemical specific risk levels. Will not meet 10(-4) cumulative risk levels. Will be protective over time.	Controls a majority of the contaminated area and minimizes migration. Significantly reduces risk.	Significantly reduces mobility, toxicity and volume of VOCs.	Minimal - Drilling acti in the release of a mir of VOCs to air.
5B	MCLs Extraction, Air Stripping and disposal by discharge to surface water, POTW or reuse.	Eliminates risk	Yes	Eliminates migration and risk.	Maximum reduction of mobility, toxicity, and volume of VOCs.	Minimal - Drilling acti in the release of a mir of VOCs to air.
5C	Northern Extraction to MCLs, Air Stripping and disposal by discharge to surface water, POTW or reuse.	Reduces risk in high levels of contamination	May be protective over time. Will eliminate risk in those areas remediated.	Only remediates targeted areas of contamination. Does not prevent migration. Reduces level of risk.	Reduces mobility, toxicity and volume of VOCs in the targeted areas of contamination.	Minimal - Drilling acti in the release of a min of VOCs to air.
5D	10(-4) Extraction, Air Stripping and disposal by discharge to surface water, POTW or reuse.	Reduces risk	Only 10 percent of ground water will be treated. Will be protective over time.	Only remediates high areas of contamination. Does not prevent migration. Reduces level of risk.	Reduces mobility, toxicity and volume of VOCs in the high areas of contamination.	Minimal - Drilling acti in the release of a min of VOCs to air.
5E	Focused Hot Spot Extraction to MCLs, Air Stripping and disposal by discharge to surface water, POTW or reuse.	Reduces risk in high levels of contamination	May be protective over time. High areas of contamination will be reduced to MCLs, eliminating risk in those areas.	Only remediates high areas of contamination. Does not prevent migration. Reduces level of risk.	Reduces mobility, toxicity and volume of VOCs in the high areas of contamination.	Minimal - Drilling acti in the release of a min of VOCs to air.
5F	Focused Hot Spot Extraction to MCLs, Air Sparging, Air Stipping and disposal by discharge to surface water, POTW or reuse.	Reduces risk in high levels of contamination	May be protective over time. High areas of contamination will be reduced to MCLs, eliminating risk in those areas.	Only remediates high areas of contamination. Does not prevent migration. Reduces level of risk.	Reduces mobility, toxicity and volume of VOCs in the high areas of contamination.	Minimal - Drilling acti in the release of a min of VOCs to air.

'*' - A range of costs is provided for many of the remedial alternatives due to the different disposal options available.

'**' - Costs for the No Action alternative include long term monitoring.

'***' - Costs for the Limited Action alternative include long term monitoring, institutional controls and public education programs.

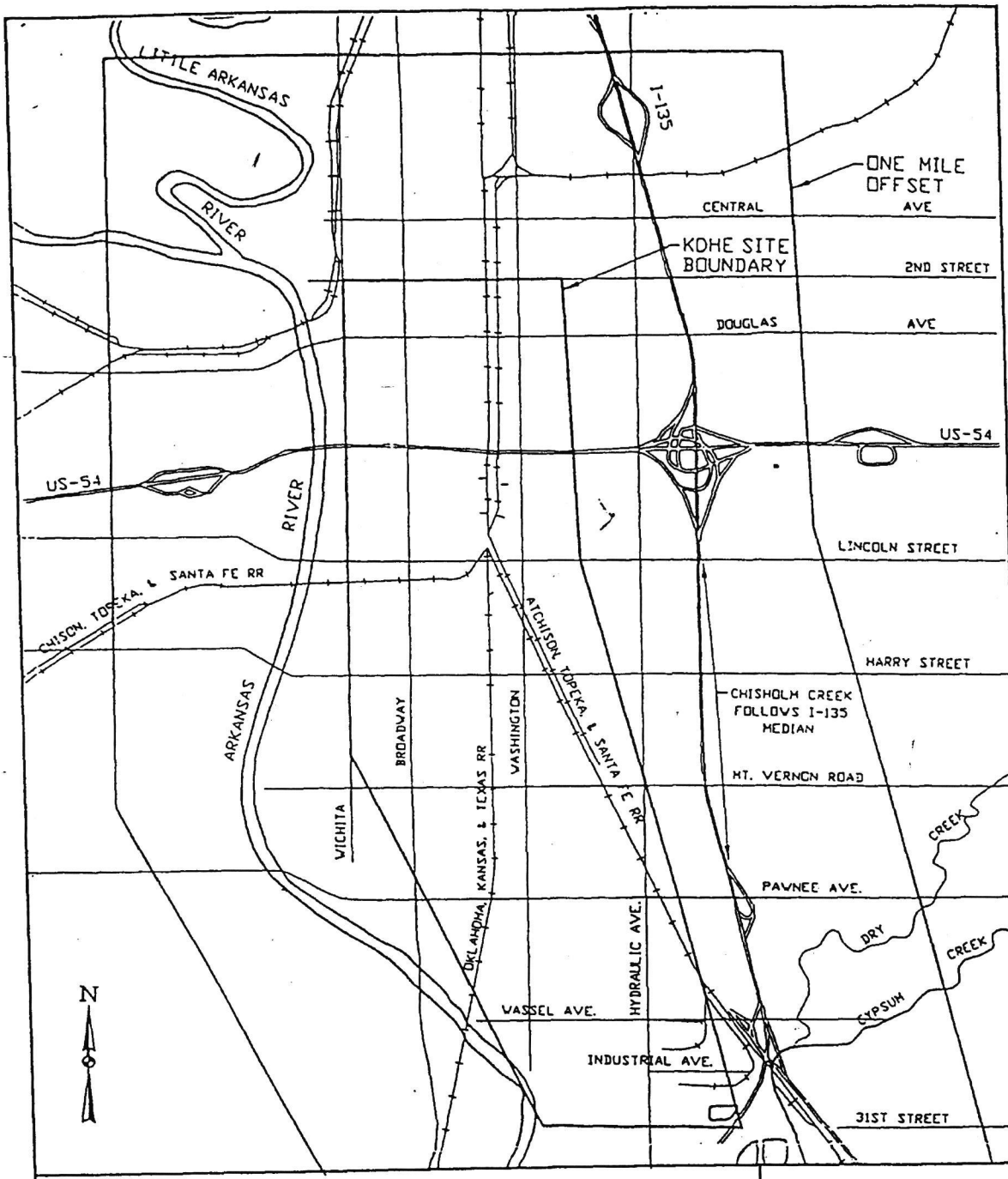

Figure 1

Gilbert and Mosley Site Map

Current Site Boundaries

K. D. H. E./1994

Legend

——— Site Boundary

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1993

GILBERT MOSLEY DISTRICT BOUNDARIES

Bounded on the north by Second Street; on the west by Wichita Street from Second to First; thence west on First to Civic Center Place; thence south on Civic Center Place and Civic Center Place extended to Lewis and Wichita St.; thence south along Wichita to Skinner; thence southeast including part of the 1900 block of South Wichita, 2000 block of South Water, 2100 block of South Main, 2200 block of South Market, 2300, 2400, and 2500 blocks of South Broadway, 2600 block of South St. Francis; 2700 and 2800 blocks of South Santa Fe, from Santa Fe and Greenway Blvd. to 31st Street south and Washington; 31st Street south being the south boundary thence along 31st Street south to I-35W; thence northwesterly along the east boundary including the 3000 block and the 2900 block of South Madison, Northern and Wassall Streets, west of Madison, Wassal west of S.E. Blvd.; 1805 Glen Oaks Drive, 2500 block of South Southeast Drive, 1900 block East Pawnee, Blake west of Minnesota, Stafford west of Minneapolis, west side of Minneapolis between Stafford and Hodson, west of Kansas between Hodson and Mt. Vernon, Linwood Park, west of Hydraulic from Mt. Vernon to Funston, the 1700 block and 1600 blocks of South Greenwood, the 1500 and 1400 blocks of South Ellis, the 1300 and 1200 blocks of South Lulu, thence beginning at the 1000 block of Pattie, north along Pattie to Douglas thence west along Douglas to Indiana; thence north along Indiana to Second Street being the north boundary.

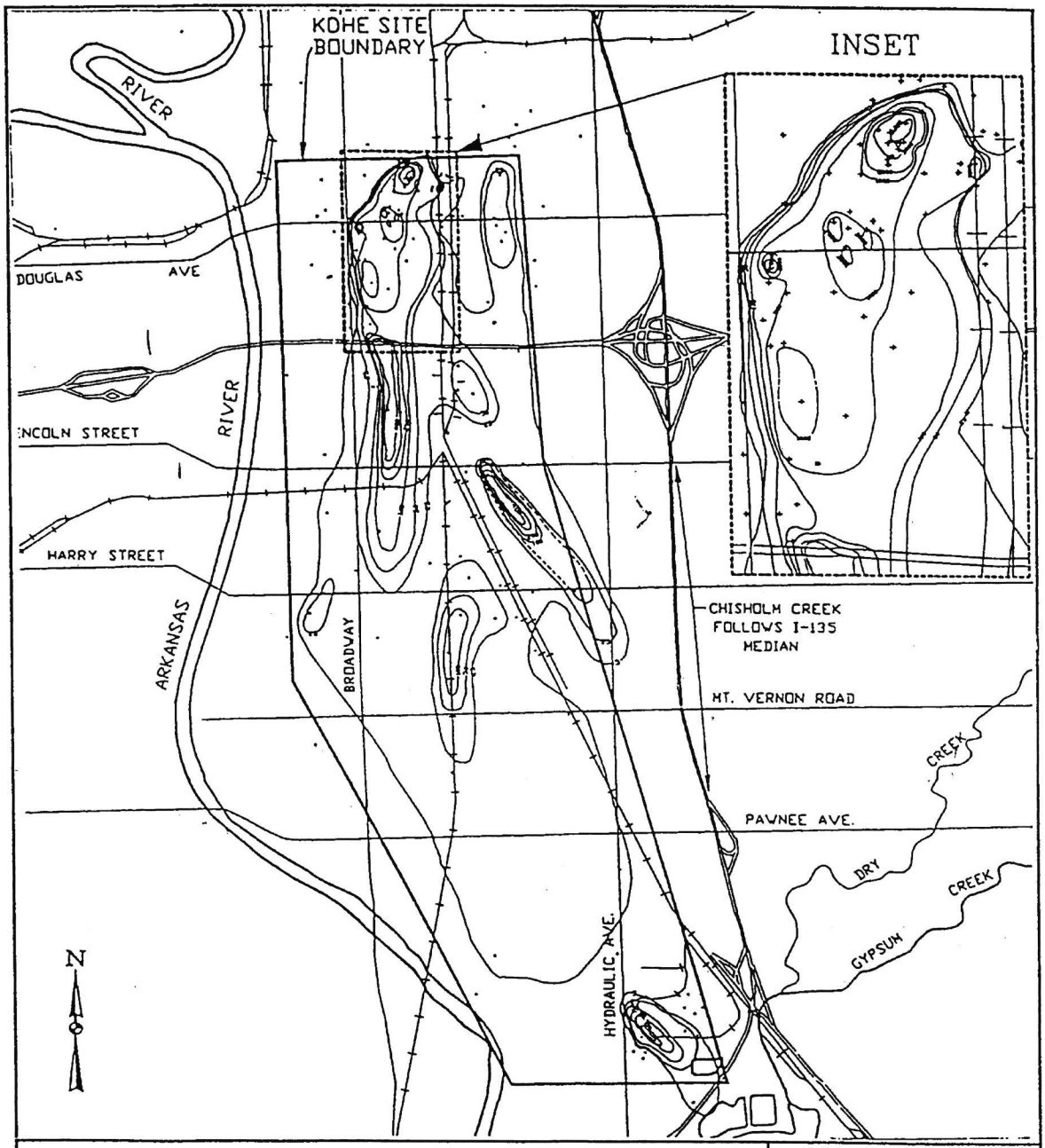

Figure 2

Gilbert and Mosley Site Map

Trichloroethene Concentration Contour Map

K. D. H. E./1994

Legend

'+' - Well Points Sampled after 5/90

Contour Line Intervals (ppb) 5,25,50,100,200,300,400

Insert Contour Intervals (ppb) 5,25,50,100,500,1000,2000,5000,10000

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

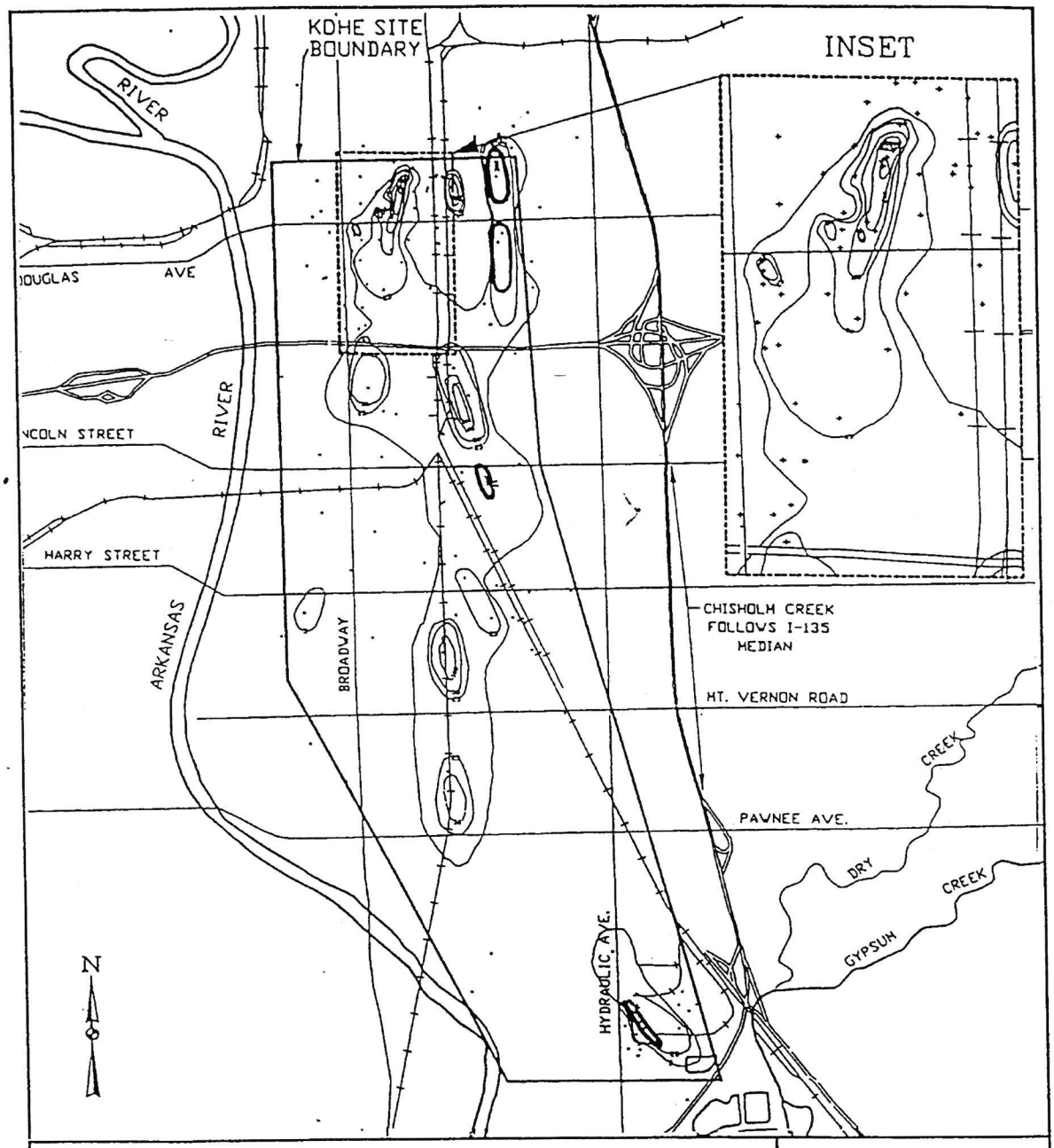

Figure 3

Gilbert and Mosley Site Map

Tetrachloroethene Concentration Contour Map

K. D. H. E./1994

Legend

'+' - Well Points Sampled after 5/90

Contour Line Intervals (ppb) 5,25,50,100,200,300

Insert Contour Intervals (ppb) 5,25,50,100,200,500,2000

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

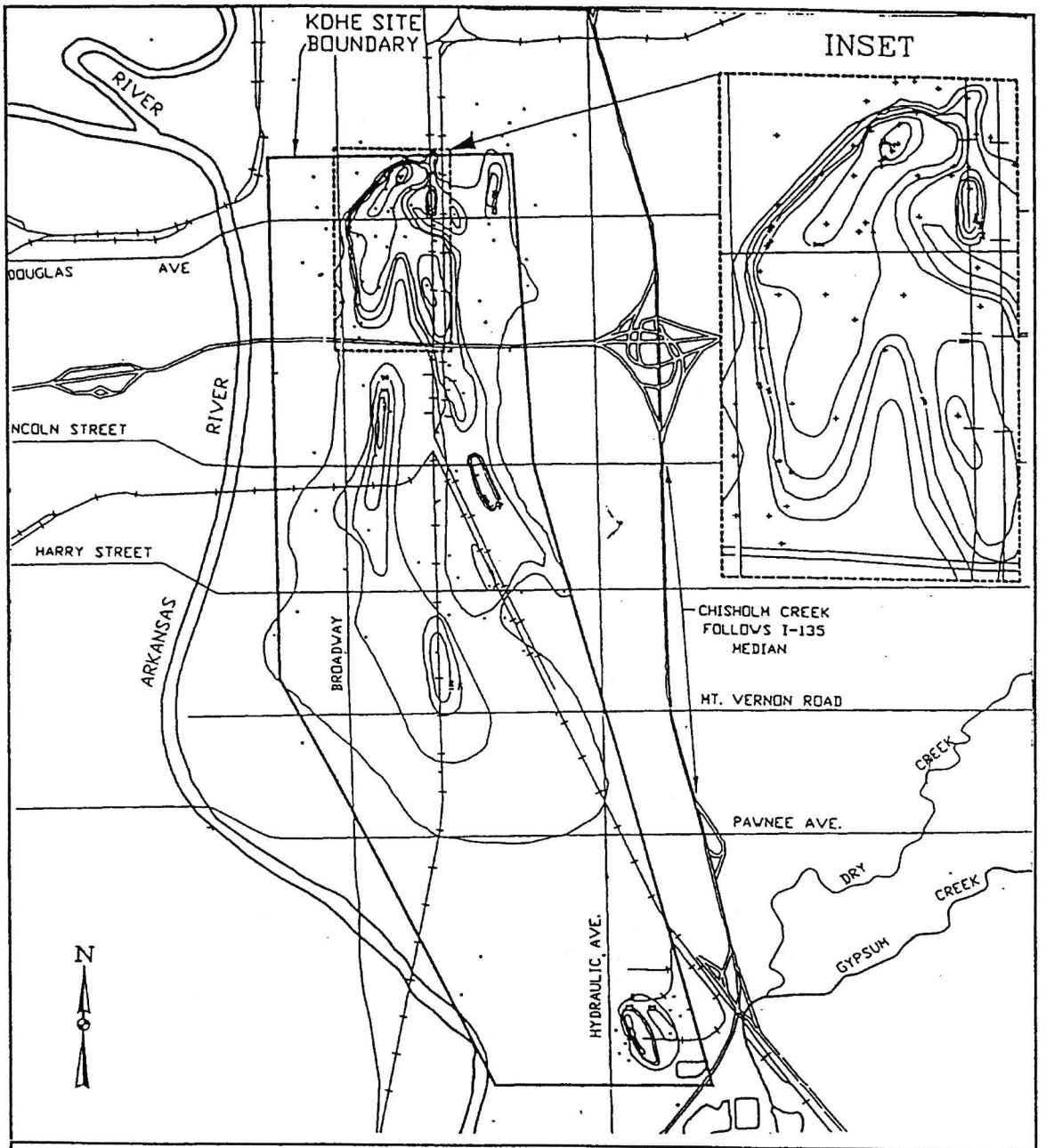

Figure 4

Gilbert and Mosley Site Map

1,2 Dichloroethene Concentration Contour Map

K. D. H. E./1994

Legend

'+' - Well Points Sampled after 5/90

Contour Line Intervals (ppb) 5,25,50,100,200,300,400

Insert Contour Intervals (ppb) 5,25,50,100,200,500,2000

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

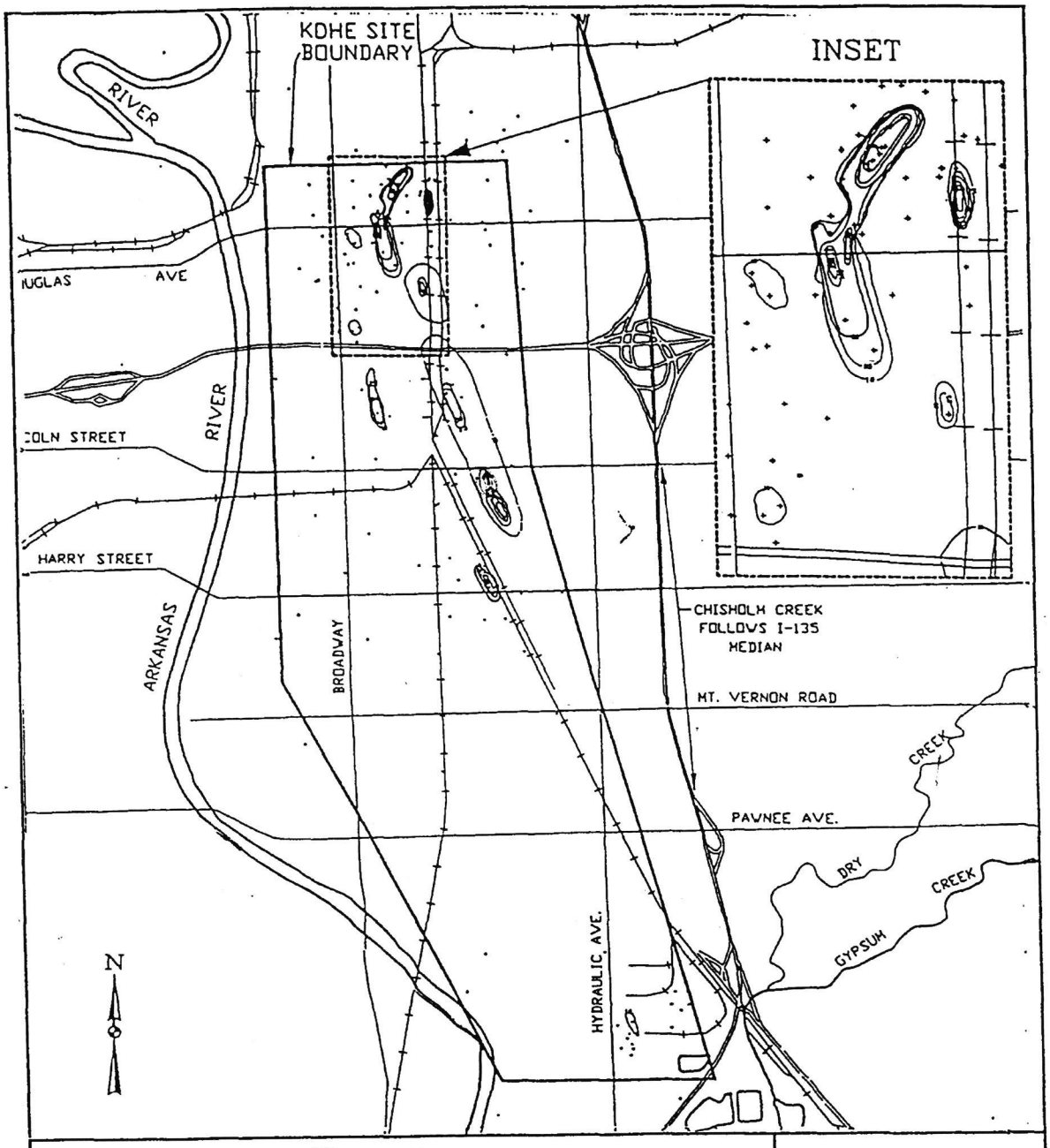

Figure 5

Gilbert and Mosley Site Map

Vinyl Chloride Concentration Contour Map

K. D. H. E./1994

Legend

'+' - Well Points Sampled after 5/90

Contour Line Intervals (ppb) 5,25,50,100,200

Insert Contour Intervals (ppb) 5,25,50,100,200,500

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

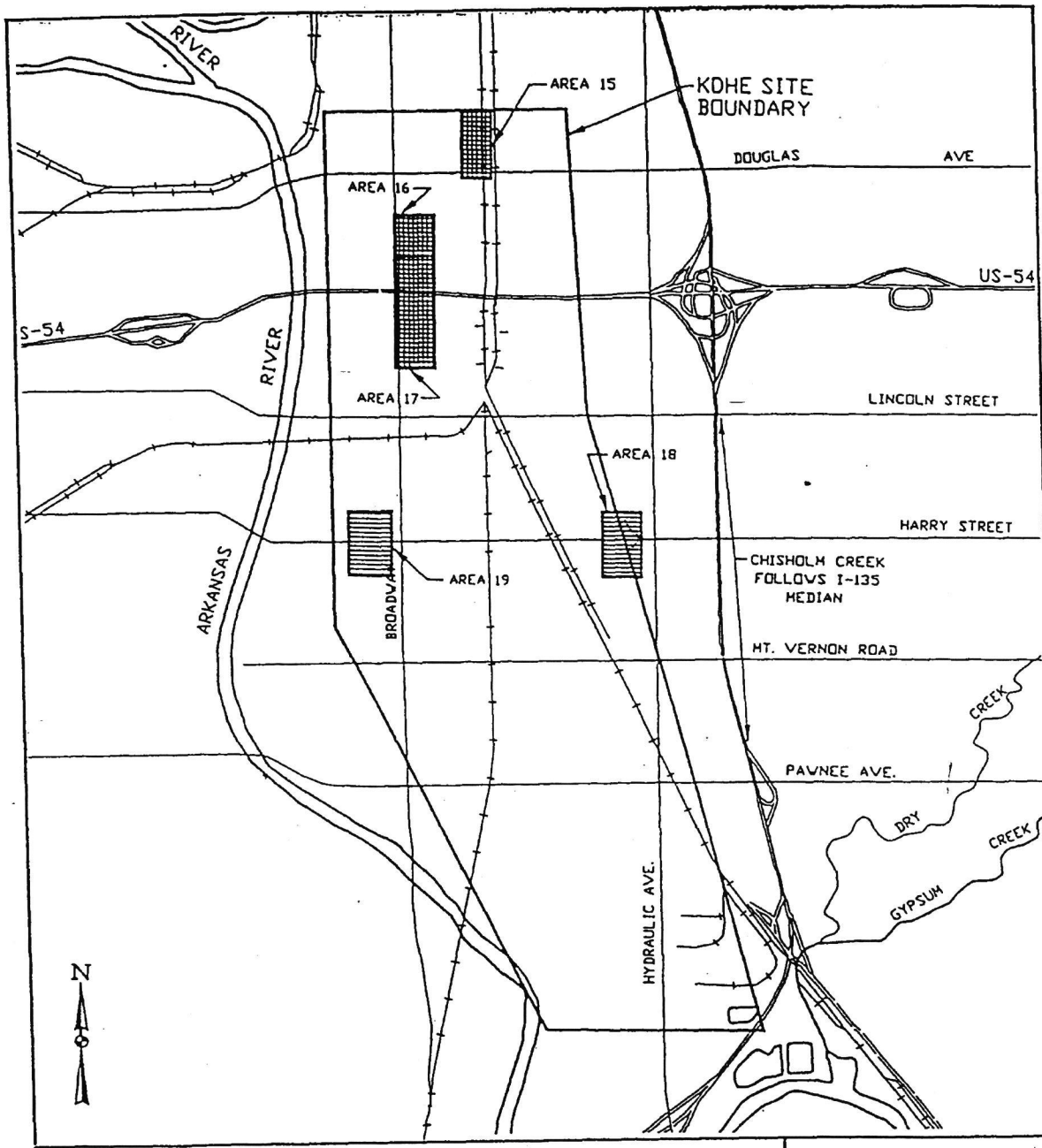

Figure 6

Gilbert and Mosley Site Map

TCE Source Areas Map

K. D. H. E./1994

Legend

Probable and/or Possible TCE Source Area

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

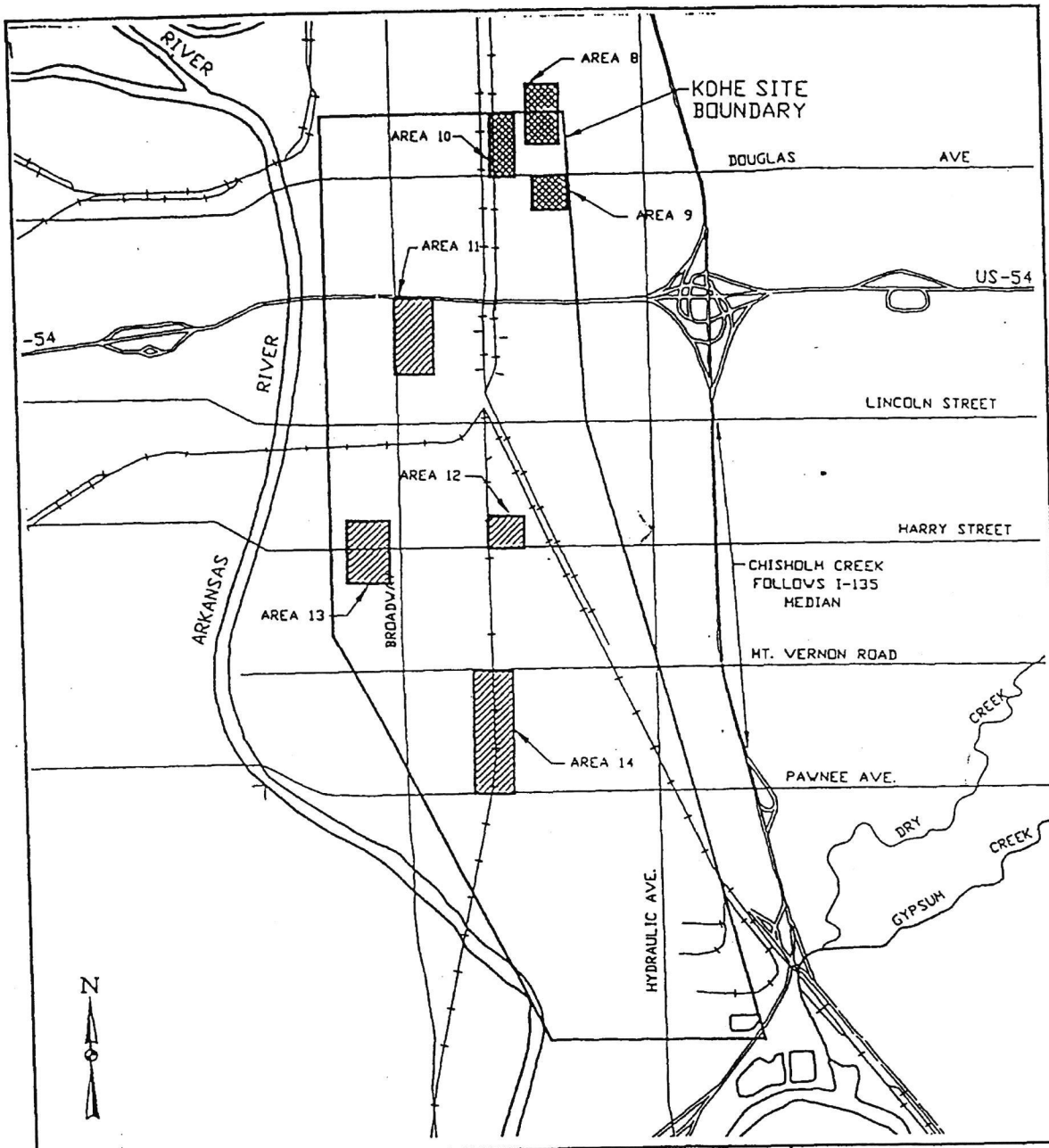

Figure 7

Gilbert and Mosley Site Map

PCE Source Areas Map

K. D. H. E./1994

Legend

Probable and/or Possible PCE Source Area

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

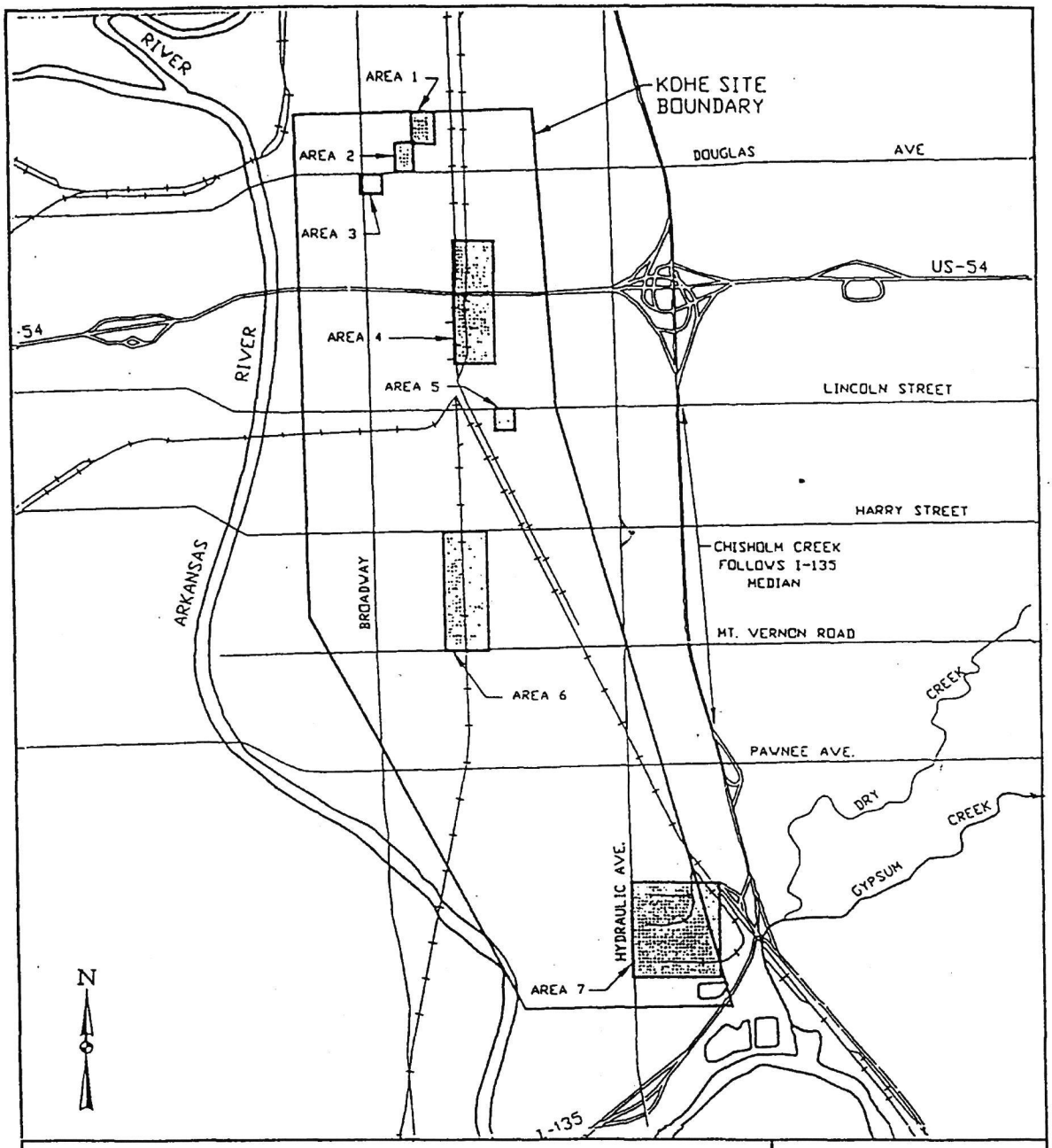

Figure 8

Gilbert and Mosley Site Map

Combination of TCE and PCE Source Areas Map

K. D. H. E./1994

Legend

Probable TCE and PCE Source Area

SCALE: 1.5 inches = 1 mile

Source: Gilbert and Mosley Site; Feasibility Study Report, Camp, Dresser and McKee, 1994

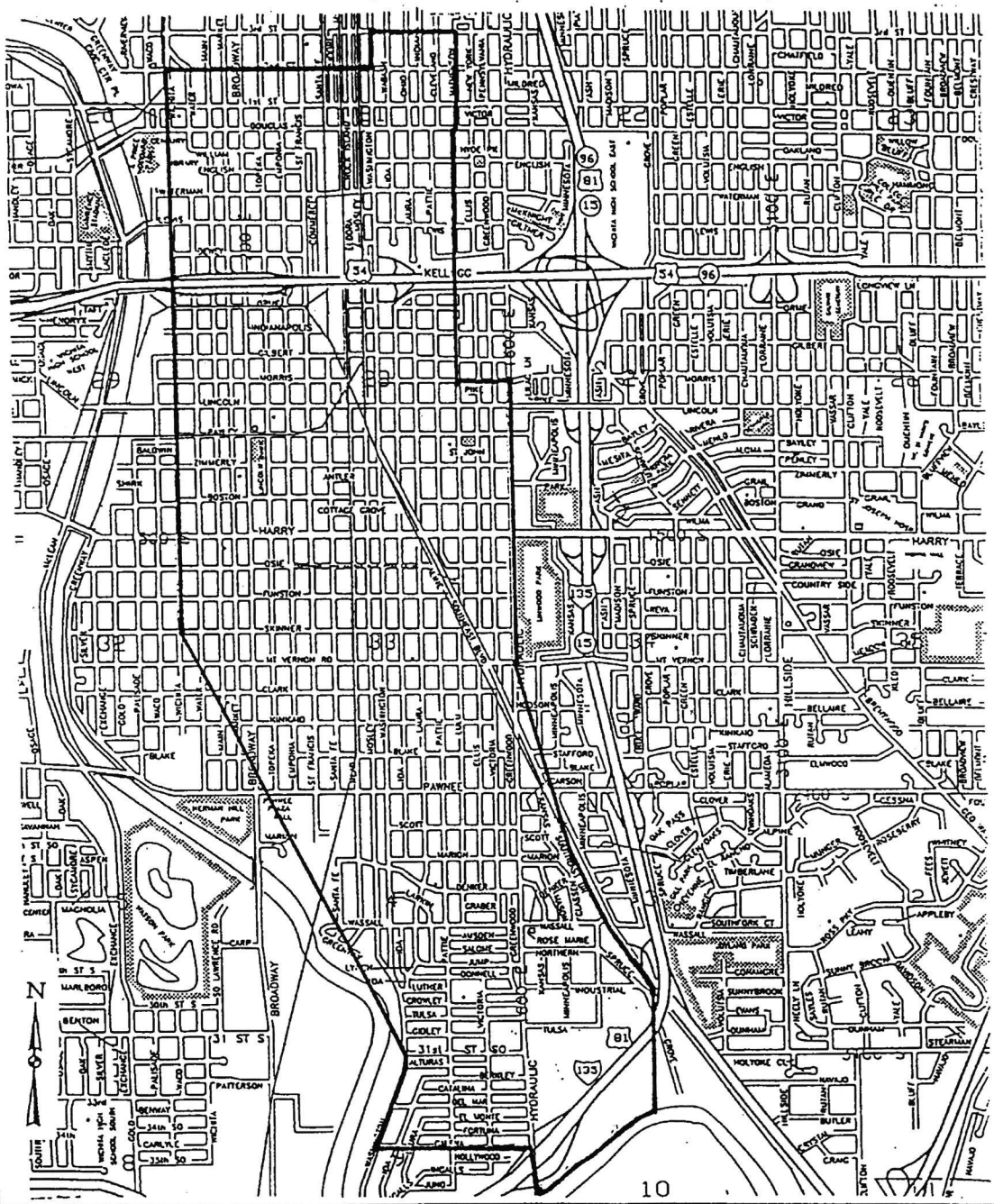

Figure 9

Gilbert and Mosley Site Map

Recommended New Site Boundaries

K. D. H. E./1994

Legend

New Site Boundary

SCALE: 1.5 inches = 1 mile

Source: KDHE and City of Wichita, 1994.

ATTACHMENT IV

Commentors

June Allen
Rob Ashcraft
Margaret W. Bangs
Thomas A. Bishop
Patrick K. Cantwell
Richard Carl
Ronald Chamberlain
Bob Cowdrey
Mike Dickson
Thomas R. Docking
Patti Doll
Frederick H. Frazier
Daryl Glamann, Sr.
Robert Goehring
L.J. Hammann
Art Houghout
Dr. Ben Huie
Brenda L. Jansen
Teresa Keefer
Carl N. Kelly
Mike McGill
Steve Meirowsky
Larry Overstreet
Dr. Padgett
Randy Rathbun
Dan Rohrback
Larry Ross
Ellie Skokan
Paul D. Stephenson
Virginia Van Cleave
F. Tim Witsman
Frank W. Woodman
John Woolf
City of Wichita